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COMSTOCK'S PATENT ROTARY SPADER.

Fig. 1

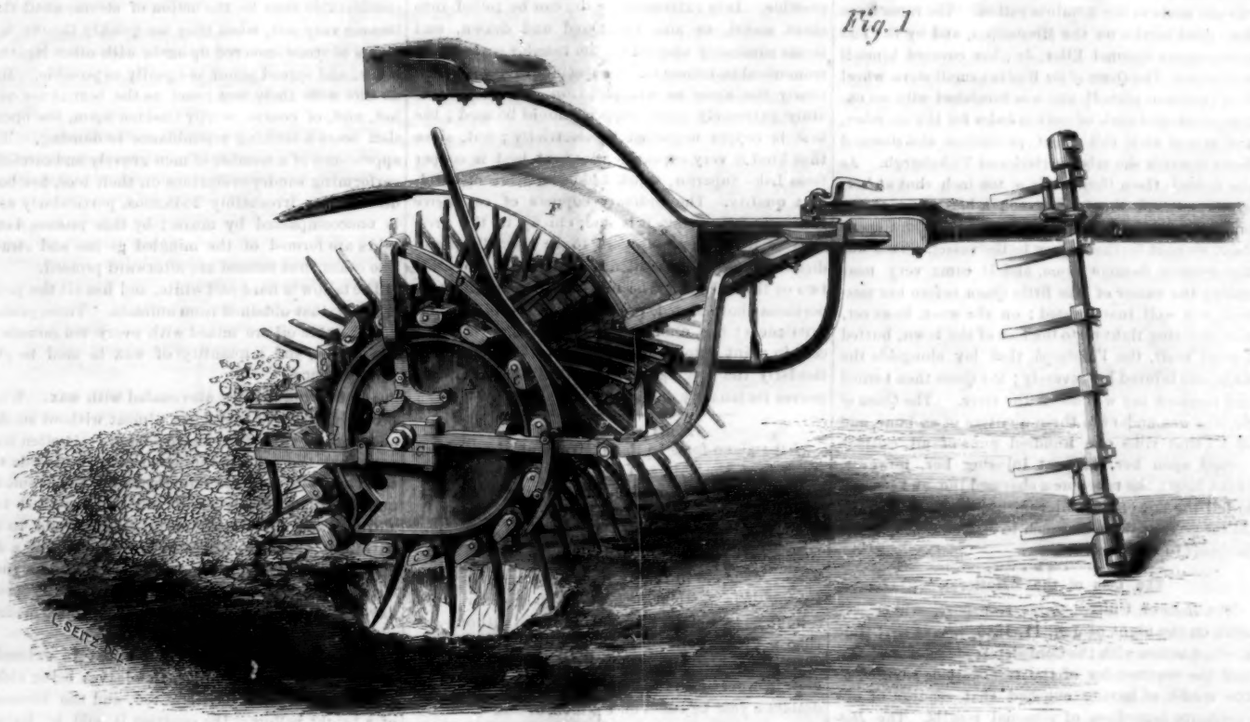
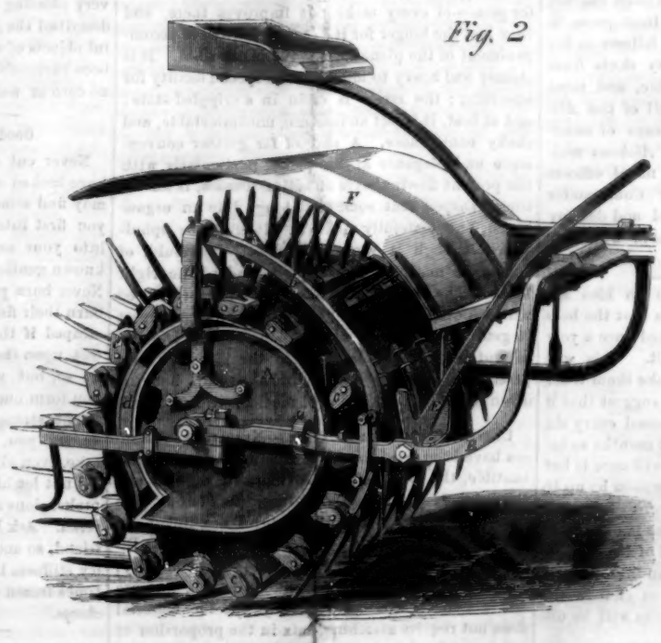


Fig. 2



Improved Rotary Spader.

The cultivation of the soil by mechanical means grows in popularity every day. A few years ago our farmers regarded patent plows, cultivators, and labor-saving machines of a similar character, as so many "inventions of the enemy;" now patented implements for farming purposes can be found for sale in nearly every village store, and in use upon every farm. The annexed engraving represents a new rotary spader of peculiar appearance and construction. The following description will be readily understood by the intelligent reader. The cast-iron cams, A, are provided with an axle to which they are keyed fast; they are attached to the wrought-iron frame, B, by the connection, C, and have further a lug, *a*, which takes against the frame, and prevents the whole strain of the draft from coming on the key. The offset iron arm, D, is bolted to the face of the cam, and has an arm, *b*, jointed to the upper end, which is curved around the periphery of the cam, as shown in the engraving, so that it forms a groove or recess, in which the fork shafts, *c*, travel. The lever, E, is jointed to the frame, and bears against the back of the arm, *b*, so that it is kept up to the lug, against which it bears when the machine is in operation; when not in use the lever is thrown toward the team and carries the arm with it, thus opening the groove. The strap, *d*, attached to the hinder end of the cam, has a piece of india-rubber interposed between it and the same, which serves as a spring. The forks are secured upon shafts, the ends of which have rollers that run around the cam as the machine is drawn along. The bottoms of the cams are tangential with the circumference and have also a peculiar hook at the hinder part, by which the action of the forks is much improved, a vibrating or sifting motion being thus obtained, which thoroughly pulverizes the soil. The plane surface at the bottom gives a horizontal movement to the excavating gear and adds very greatly to the efficiency of the tool. The iron apron, F, affords a protection from danger to the driver, in case of the breakage of the seat, from which point the operation of the machine is directed. The team is attached by the usual appliances to the pole, G, against which a detached roller shaft is seen inclined. The apertures, *e*, in the face of the cam wheel are made for convenience of access in adjusting the forks and the shafts in place.

Fig. 2 is a representation of the machine with the forks thrown out of gear with the cams. The lever,

E, is thrown forward, and the arm, *b*, then relaxes and so widens the groove that the forks assume the position shown in the engraving, and the machine may be drawn over the ground without their entering it. The arrangement of the other parts is similar, and presents no peculiarities not previously described.

The patent for this invention was procured May 16, 1862, by C. Comstock, of Milwaukee, Wis., and further information may be obtained by addressing the inventor as above.

The Feat of the "Queen of the West."

One of the most brilliant naval feats of the war—the running of the blockade at Vicksburgh, on the Mississippi, by the ram *Queen of the West*—was performed on the 2d inst., by Colonel Ellet, son of the late brave Colonel C. F. Ellet. The *Queen of the West* is one of the seven rams built by the Government, under the supervision of Colonel C. F. Ellet, and in accordance with suggestions which he had from time to time made to the Administration. The rams have done good service on the Mississippi, and by the last achievement Colonel Ellet, Jr., has covered himself with glory. The *Queen of the West* is a small stern-wheel boat (not iron-plated), she was furnished with an extempore breastwork of cotton bales for the occasion, and armed with this slight protection she steamed down towards the rebel batteries at Vicksburgh. As she neared them they let fly a ten-inch shot at her, which entered the bow, struck a brass gun there, broke it in two, and finally, glanced off and spent itself without further injury to the vessel. This was the greatest damage done, and it came very near ending the career of the little *Queen* before her mission was well inaugurated; on she went, however, and, shooting right up to the face of the town, butted a rebel craft, the *Vicksburgh*, that lay alongside the dock, and injured her severely; the *Queen* then turned and resumed her way down the river. The *Queen of the West* was under fire three-quarters of an hour, and in all that time one hundred guns of all calibers opened upon her, without injuring her, however, in the least; the ram bore a charmed life, and escaped to tell the tale of her achievement. Such daring and skilful feats as these do much to elate the people and do credit to all concerned.

The Loss of the "Hatteras."

The *Hatteras*, United States transport, which was sunk on the night of Jan. 11, 1863, was at that time in close action with the Confederate steamer *Alabama*, and the commander of the transport is entitled to the credit of having engaged that scourge of our commerce regardless of personal results. The *Hatteras* was a small side-wheel boat with a beam engine; she was very vulnerable and totally inadequate to cope with her antagonist. The brave fellows on the transport succeeded in firing some fifty shots from guns of twenty and fifty-pound calibre, and must have inflicted some damage to the hull of the *Alabama*, how great it was we have no means of ascertaining. The *Hatteras* fell in with the *Alabama* accidentally it seems, but if all of our naval officers would exhibit the spirit evinced by Commander Blake, they would doubtless soon find and destroy that formidable vessel, and all the others which are on a kindred mission of plunder.

Planing-machine Beds.—We notice an idea advanced in the London *Engineer*, which is that the beds of planing machines should be reversed once a year where their construction permits it. This will equalize the wear of the slides and make them truer than they would otherwise be. We suggest that if they are changed at all, they be reversed every six months, as carelessness will in twelve months so injure a planing machine that nothing will cure it but being made over. If, however, the artisan be up to his business, he will so arrange his work on the bed that it will wear true at all times; if he is obliged to work any length of time on one end of the bed, he ought to divide the periods so as to run first one end of the platen over the slides and then change the other end. In this way the best results will be obtained.

The number of sea-going vessels in the world is about sixty-five thousand, two thirds of which belong to England and the United States.

Aluminium Bronze.

In the *Philosophical Magazine* there is an article by Lieut.-Col. A. Strange, F. R. A. S., on the properties and present value of aluminium bronze, an alloy consisting of ten parts of aluminium and 90 of copper. Its tensile strength is stated at 73,185 lbs. per square inch, being more than double the breaking strain of gun-metal, and 1,185 lbs. more than the average tenacity of cast-steel. Its resistance to compression is 132,416 lbs. to the square inch; that of cast-iron being 115,542 lbs. As to malleability, this alloy may be drawn out under the hammer almost to a needle point at a red heat. Its rigidity is about three times that of gun metal, and forty-four times that of brass; it is less affected by change of temperature than either of the latter; it may be cast with extraordinary facility into any shape; it does not clog the file, and yields fine elastic shavings on the lathe. It tarnishes much less readily in the air than any other metal or alloy used for astronomical instruments, and will receive the finest graduation possible. It is extremely elastic, can be rolled into sheet metal, or also hammered and drawn, and seems admirably adapted for the tubular parts of astronomical instruments. Its specific gravity is 7·689, nearly the same as wrought iron. To make this alloy extremely pure, copper should be used; the best is copper deposited by electricity; but, since that kind is very expensive, the next best is copper from Lake Superior, which makes an alloy of excellent quality. The ordinary coppers of commerce generally fail, owing, it is said, chiefly to the presence of iron, which appears to be specially prejudicial. Another precaution is to re-melt the alloy two or three times. The first melting, in the proportions above stated, produces an alloy of extreme brittleness; but each successive melting, up to a certain point determined by the working, and particularly the forging properties of the metal, improves its tenacity and strength.

Hints about Pianos.

If the piano-forte be the instrument of use, bring it out from the wall, so that a free space be before you when you sing or play. Never sing up against a wall, if you can help it, or subject your friends to this sore trial. Moreover, never lumber a piano with music and books; it is unartistic. Above all, keep your piano in tune. If an instrument is worth having, it is worth being kept in good order. You cannot have a piano long out of tune without getting your ear out of tune, and if a singer, your voice. The Erard grand pianos of New York are all kept in order by one accomplished tuner. For twelve dollars a year he tunes once a month, and oftener if necessary. Such an arrangement should be made for pianos of every make. It improves them, and they last the longer for it. A very awkward accompaniment of the piano-forte is the piano-stool. It is clumsy and heavy to move; has a special facility for upsetting; the screw is often in a crippled state; and at best, it is but an insecure, uncomfortable, and shaky contrivance. A seat of far greater convenience and elegance at the piano, particularly with the present flowing style of ladies' dresses, is an ottoman-shaped seat somewhat long, like an organ-bench, but tastefully modeled. It might be upholstered, though it were better not. It should, of course, be made for the purpose, and of the right hight. The most comfortable off-hand or improvised seat is a cane chair; and, by the way, let us suggest to gentlemen never to sit on a piano-stool. The dignity of but few men is equal to the situation of a perch on such a tripod, with the coat-tails hanging down behind; a chair, by all means!—*Once a Month.*

Uninflammable Preparation.—Numerous substances have been tried to render muslin dresses incombustible, the best being the tungstate of soda and the sulphate of ammonia. Tungstate of soda, prepared expressly for rendering fabrics non-inflammable, can be obtained, by order, of any chemist. Directions for use:—To three parts of good (dry) starch add one part of tungstate of soda, and use the starch in the ordinary way. If the material does not require starching, mix in the proportion of one pound of tungstate of soda to two gallons of water; saturate the fabric with this solution, and dry it. The heat of the iron in no way affects the non inflammability of the fabric.

The Tallow Tree in China.

The tallow tree, called by the Chinese "Oo-Ricon," is of the hight and appearance of a pear-tree, with twisted branches and a large round head. The trunk is short and thick, and the bark smooth. The leaves are alternate, and resemble those of the black poplar. The blossom is yellow; but the most singular part of the tree is the fruit, which is enclosed in a husk like that of a chestnut. When the fruit is ripe the husk opens of itself, showing three white grains about the bigness of a filbert. These grains contain the beautiful vegetable tallow so useful to the Chinese. The fruit of the tallow tree goes through nearly the same process as the seed of the oil plant.

The machine by which it is bruised consists of a wheel moved backward and forward in the trunk of a tree, which is shaped like a canoe, lined with iron, and fixed in the ground. The axis of the wheel is attached to a long pole, which is laden with a heavy weight and suspended from a horizontal beam. The berries thus bruised and divided are exposed for a considerable time to the action of steam, until they become very soft, when they are quickly thrown into layers of straw, covered up again with other layers of straw, and spread about as equally as possible. Men do this with their feet; and as the berries are very hot, and, of course, warily trodden upon, the operation bears a striking resemblance to dancing. The appearance of a number of men gravely and carefully performing sundry evolutions on their toes, has been described as irresistibly ludicrous, particularly as it is unaccompanied by music; by this process large cakes are formed of the mingled grains and straw. The cakes thus formed are afterward pressed.

The tallow is hard and white, and has all the properties of that obtained from animals. Three pounds of vegetable oil are mixed with every ten pounds of the tallow, and a quantity of wax is used to give it consistence.

The best candles are also coated with wax. When properly prepared they burn almost without smoke, and are free from disagreeable smell. It often happens that the candles prepared with vegetable tallow burn with a great flame, throw out much smoke, and consume quickly; but this is attributed to a slovenly and dirty mode of preparation and to the nature of the wick, which is usually made of a dry and light wood, not much unlike the wick of a rush-light. Candles made of this tallow by Europeans have been found very nearly equal to those made of wax.

The tallow tree is usually planted in extensive plains and in regular order, the leaves being either of a deep purple or brilliant red, and the blossoms of a bright yellow; the contrast is said to have a very pleasing effect; and European travelers have described the groves of those trees as the most beautiful objects of a Chinese landscape. This tree has now been successfully acclimatized in Algeria; it requires no care or watering.

Good Advice on Sundry Subjects.

Never cut a piece out of a newspaper until you have looked on the other side, where perhaps you may find something more valuable than that which you first intended to appropriate.—Never put salt into your soup before you have tasted it. I have known gentlemen very much enraged by doing so.—Never burn your fingers if you can help it. People burn their fingers every day, when they might have escaped if they had been careful.—Don't put your feet upon the table. True, the members of Congress do so, but you are not a member of Congress.—If you form one of a large mixed company, and a diffident stranger enters the room and takes a seat among you, say something to him, for heaven's sake, even although it be only, "Fine evening, sir!" Do not let him sit bolt upright, suffering all the apprehensions and agonies of bashfulness, without any relief. Ask how he has been; tell him you know his friend, so and so—anything that will do to break the icy stiffness in which very decent fellows are sometimes frozen on their *debut* before a new circle.—*Exchange.*

The total foreign debt of Ohio is $14,141,662. The debt of Illinois is $13,337,381, most of which is foreign. The public debt of Pennsylvania is $40,448,213.

Scientific Warfare.

We should like to see a soldier rigged out in the numerous devices which have appeared since the commencement of the war, in our excellent contemporary, the SCIENTIFIC AMERICAN. We should like, also, to know what he would weigh in full working order; i.e., able to do such small repairs as his arms might need, to make gunpowder, to cut off a leg or perform other surgical operations, to distill foul water, to purify beef, to cook such food as soldiers use, to patch shoes and breeches, and having withal wherewith to make a bed, a table and a few chairs. It has always puzzled us to know how the man of war would transport all of these useful appliances; but the difficulty is now removed. The last number of the SCIENTIFIC contains the "Portable Breastwork," which is, in brief, a wheelbarrow with a piece of boiler plate about as big as a barn door, so fixed as to be adjusted at any angle, thus affording a complete protection to the infantry man in the field. We see no objection to the use of this apparatus, provided the ground is in all cases smooth and hard, with no dead bodies in the way, and no high winds. The many advantages attending the use of the "Patent Life-preserving Wheelbarrow" can hardly be enumerated. With this, the soldier could easily transport a small stove, writing desk, library, hammock, tent, a barrel of apples, a bushel of doughnuts, reports of investigating committees, hospital stores, &c. The order of battle need not even be disturbed at night; since each soldier could camp where he stood. In event of defeat, a rout would be utterly impossible; for no cavalry nor foot troops could ever make their way over such *chevaux de frise* as would be presented by the debris of half a dozen regiments of wheelbarrows. The only danger would be that the unscientific enemy might some night, when each man was sound asleep in his wheelbarrow, take it upon them to wheel off our troops; but doubtless the inventor of the machine could arrange a patent brake for the wheels.—*Railway Times.*

All that the facetious editor says is true. Look also at what our inventors are doing among the appliances and utensils of the laundry and kitchen. We have lately been impressed with the idea that "Biddy" has rather a good thing of it in the kitchen, and our suspicions are now resolved into certainty; she has only to turn a crank and the garments issue from the squeezing machine much "dhrier," as she phrases it, than even her brawny arms could twist them; she need not henceforth crack and strain her mighty thews in vain. So also with the hand-irons. The "exile from Erin" is no longer in danger of overheating the delicate cuticle with which Nature has covered her fingers and arms; the heat-intercepting envelope (illustrated in this number) shields her from injury, and protects her from the too fervent heat of the iron. The portable clothes-dryers come to the aid of "Biddy," and enable her to hang out her garments from the windows, so that her fragile limbs are not endangered by descending the stairs with heavy burdens; and the washing, churning, and we don't know how many other contrivances of the kind, secure to the modern housemaid an immunity from over-exertion that must be highly delightful. Even milking is now done mechanically, and we saw an individual, only the other day, vending a whistling machine (think of that, ye puckerers!), and it made a melodious echo unapproachable by any human sibillation. Where the inventors will cease in their efforts to utilize muscle is, after this latest achievement, quite inscrutable.

We thought we had rather exhausted the catalogue of invention when we chronicled the performance of the whistling machine; since the above was in type we have received a suggestion from a correspondent that some public-spirited person should invent "a pair of tongs for handling chicken and spare-rib bones," as it is very disagreeable to have the fingers greased at the table. We call the attention of inventors to this latest requirement of domestic economy, adding only that if they will also make a machine to masticate tough beef, it will not be unprofitable in boarding-houses and hotels. How is it, Messrs. Inventors, shall we have the tongs for table use?

A COMPLIMENT WELL EARNED.—Mr. William Gorman, the Chief Engineer of the steamship *Roanoke*, has been presented with a splendid gold watch by the agents of that ship, Messrs. Ludlam & Heineken, for services rendered during a severe gale, in which the vessel was caught. We know Mr. Gorman very well and think that the compliment was one well earned and deserved by him; he is a hard-working indefatigable officer in whom our steamship owners can place confidence.

LARGE sums of money are expended annually in obtaining the fertilizing material, guano, from distant islands, in the sea; while in our cities vast quantities of materials embracing the same properties are allowed to pollute the sewers and flow unreclaimed into the sea.

MISCELLANEOUS SUMMARY.

CALIFORNIA WOOL.—In 1855 there were only 860,000 pounds of wool raised in California; in 1863, there were 64,000,000 pounds raised. The *California Wine and Wool Register* says respecting wool:—"The past three years have been marked by a steady improvement in the quality of our wool, and in a less degree by a more careful attention to putting sheep in a marketable condition by the farmers. Our farmers have expended more money upon fine wooled breeding sheep within three years than any other State in the Union has done in ten years; but they will lose much of the benefit of these investments, unless they give to the shearing, tying and packing of their wool much more attention than they have yet done."

THE EXACTIONS OF JOURNALISM.—Every editor knows and has felt the truth of the following assertions, which we copy from an exchange:—"It is one of the hardships of the profession that its working wheels—brains and hearts—are not allowed to lag for sickness or stop for calamity or sorrow. The judge may adjourn his court; the school and the workshop may close shutters; the mourner may veil features, and turn friend and stranger from the door, but the journalist must forget before the *to-morrow* of to-day, must write gaily and freshly as a newsmonger on the trifle of the hour, whatever burden has been laid on that same hour by Providence."

THE "WHAT IS IT" A FAILURE.—The famous submarine battery, which was intended to remove rebel obstructions in the James river, Va., has turned out a complete failure. She cost the Government some fifteen thousand dollars, exclusive of armament. Upon her recent trip she sank at once to the bottom (instead of floating just beneath the surface), and it has since been found impossible to raise her. The frame is fast breaking up by the action of the breakers. She is near Coney Island, and there will soon be nothing left except her iron-work and guns, which may possibly be recovered.

MATERIAL FOR SHIPS OF WAR.—It is proposed to supersede the use of armor plates for ships by willow-wood of the thickness of a foot, having a steel rolled plate of one inch and a half inserted in the middle of the wood. This wood has the property of resisting compression to a great degree, and possesses the same cohesive and repulsive properties as steel. Whalebone, from its cohesion and tenacity, has likewise been proposed as an extra backing for the iron plates, placing the same between the iron and the teak or willow. Horn has its advocates as an additional backing.

TAX ON PATENTED ARTICLES.—Commissioner Boutwell has made the following decisions under the Internal Revenue law in regard to the manufacture of patented articles. Whenever a person is the owner of a patent or of the right to manufacture a patented article, and employs other persons to make such patented article, the patentee or owner of the patent right will be regarded as the manufacturer, and the tax will be assessed upon the sales as made by him or his agents.

AN ice mirage was lately witnessed in Buctouche, Kent county, N. S., by which a portion of Prince Edward's Island, fourteen miles distant, seemed to be suspended in the air and very near, so that the clearing and buildings could be distinctly seen; and with a moderately powerful spy-glass, cattle and vehicles could be distinguished moving about.

THE Bedouins, says Ritson, are a most alert and military race, and yet it is an undoubted fact that the quantity of food usually consumed by the greater part of them, does not exceed six ounces a day. Six or seven dates soaked in melted butter, serve a man a whole day, and he esteems himself happy when he can add a small quantity of coarse flour or a little ball of rice.

A MR. STOKES of Trenton, lately sued Judge Narr of the *True American*, for damages, for having put his marriage among the deaths. Although the editor offered to make it all right by putting Stokes' death among the marriages, the indignant Benedict would not accept the *amende honorable*. Damage six cents.

THE Canadian journals continue to complain of a "plethora of silver."

THE NEW YORK STATE AGRICULTURAL SOCIETY.—The annual meeting of the New York State Agricultural Society was held at Albany on the 11th inst. The report of the Treasurer shows that the receipts for the year were $17,169 02; expenditures, $18,354 96, including $4,486 77 paid on premiums of the last State Fair; cash on hand, $3,814 06, including the State appropriation of $2,000 for flax machinery premiums. Edward G. Faile, of Westchester, was elected as president, and B. P. Johnson as corresponding secretary. The next State Fair will be held at Utica.

A SHOCKING RECORD.—The suicides in France now average ten a day; the number for the present century, thus far, is over three hundred thousand. Not a day passes in which a suicide may not be directly traced to want of success in life; to the false moralities inculcated by wicked or ignorant writers; to the failure of parents in obtaining a proper influence over their children; to unrestrained appetites and passions; and to the inability of multitudes "to get along in the world" prosperously, for want of thoroughness of preparation for their calling or station in life.—*Hall's Journal of Health.*

THE AGRICULTURAL DEPARTMENT.—The Committee on Agriculture in the House of Representatives has prepared a bill defining the duties and providing for the officers in the Agricultural Bureau. It authorizes the employment of a chief clerk, a botanist, chemist and entomologist, at a salary of $2,000 each per annum; also a disbursing clerk and a chief of statistics at $1,800 each; a translator and draughtsman at $1,400 each, and six clerks at $1,200 each. Here will be a nice opening, we fear, for a new batch of enterprising politicians. They will have a finger in the pie, somehow.

"HEAVY DAYS" IN THE NEW YORK POST-OFFICE.—We find the following in the last *United States Mail*:—"Some idea will be given of the immense labor in the New York Post-office, when the fact is mentioned that, on one day lately, in addition to the usual work, there were received by steamer from Newbern, N.C., 66,000 letters; Port Royal, 16,000; and three mails from New Orleans by different steamers, bringing about 15,000—making, in all, nearly 100,000 extra letters in one day. On the following morning, by the arrival of the *Saxonia* with the European mails, over 30,000 letters were received."

THE skate factory of Messrs. Williams, Morse & Co., in Skowhegan, Maine, has manufactured over 30,000 pairs the present season, all of which were sold to a single firm in Boston. They make nineteen different varieties of skates, and nearly every process in the manufacture is performed by machinery.

IT is stated that, with 125 presses, the Treasury Department is just able to print enough green-backs in two-thirds of a day to pay the expenses of the Government for one day.

WITHIN one month past about 14,000 bales of cotton have reached Cairo, Ill., on their way to a northern market.

NEW LONDON, Conn., is the choice of a majority of the committee on the location of naval depots for a new navy yard.

C. H. ADAMS, of Cohoes, N. Y., has a contract to furnish the army with 36,000 knitted shirts.

PAPER collars have advanced from 25 cents to 40 cents per dozen.

Starvation Prices.

Let those who are fond of grumbling at high prices peruse the following extract relating to the cost of provisions during the siege of Gibraltar by the French and Spanish in 1777:—

"During the siege the most common necessaries of life were exorbitantly dear. Bad ship-biscuit, full of worms, was sold at one shilling a pound; flour, in not much better condition, at the same price; old dried peas at one shilling and fourpence; salt, half dirt—the sweeping of ships' bottoms and storehouses—at eightpence; old salt butter at two shillings and sixpence; and English farthing candles at sixpence apiece. Fresh provisions commanded much higher prices. Turkeys sold at three pounds twelve shillings; sucking pigs at two pounds two shillings; and one pound one shilling was refused for a calf's pluck."

MODERN ENGLISH ENGINEERING PRACTICE.

Mr. William Fairbairn, the eminent English engineer, publishes a paper, in the *Popular Science Review*, on the steam machinery in the Exhibition recently held in London. We append some extracts from it. Mr. Fairbairn says that in 1859 the steam-engines employed in the various factories, steam ships, and locomotives, amounted to 10,950,000 horses' power, but that at the present time this sum has increased to 12,000,000 horses' power, and this may be taken as the steam motive force in the British islands:—

"Nearly all engines at the present time work the steam expansively; that is to say, they are so arranged in the construction of the valve motions as to cut off the communication with the boiler at one-third, one-half, or two-thirds of the stroke, as the case may be, in regard to pressure, or the power to overcome the resistance of the load. Some engineers go so far as to cut off the steam at one-sixth and one-eighth, and expand the remaining five-sixths or seven-eighths of the stroke. Formerly the principle of expansive working was very imperfectly developed; but that system is now thoroughly understood, and is in almost every case resorted to. The result of its introduction has been an immense economy; for more than double the quantity of work is now done with the same quantity of fuel, of what was formerly accomplished on the old non-expansive principle. It must, however, be borne in mind that this cannot be effected without an increase of the pressure of steam, and hence follows the necessity of having the boilers of increased strength and improved construction. The neglect of these precautions has resulted in serious and fatal accidents, attended with a considerable loss of life and property. Irrespective of increased pressure, and working the steam expansively, the speed of the engine has been increased about one-third since the days of Watt. In his time the piston of the stationary engine traveled at the rate of 240 feet per minute; now it averages from 300 to 320 feet, and this, combined with high-pressure steam worked expansively, increases the power of the engine, in some cases, upwards of twofold, and, as already stated, doubles the quantity of work done with the same quantity of fuel. Thus an important saving is effected to this and every other country where steam is employed as an agent of power and motive force.

"After the preceding necessarily technical remarks, we may state that the Exhibition of this year does not present any new or original conception in the construction of stationary engines, with the exception of the non condensing engines, which, in this case, have their cylinders horizontal instead of vertical, as exhibited in the old construction. There are some advantages in this, as the cylinders of the non-condensing engines are comparatively small, and are less liable to wear oval than would be the case in the large condensing engines. These engines are, however, chiefly used as assistants to the stationary condensing engine, and effect a saving by the steam being employed twice over, for it first propels the piston of the high-pressure horizontal engine, after which it is conveyed to the cylinder of the large condensing engine, where it finishes the work at a considerably reduced pressure. These double engines are mere substitutes for the compound engine of Woolf, with this disadvantage, that considerable loss is sustained by condensation in the transfer from one engine to the other; and taking into account the back pressure and other causes, this combination is less effective than the united compound engine. But exclusive of these drawbacks, it is found from practice that the non-condensing engine does nearly the whole of the work, and in many instances drags forward (if we may use the expression) the piston of the old condensing engine along with it. The work done by the larger engine is, therefore, *nil*, or little more than what is gained by vacuum and condensation. In the Woolf or compound principle, this is not the case to the same extent; but it yet remains to be solved what benefit there is in a more expensive and more complicated construction, when the same advantages can be obtained by the single cylinder. That is the question for solution, and to which the advocates of double cylinder reply, that in working with high-pressure steam, the force applied to the piston of the first cylinder is diffused over a much smaller area, and the action is less severe upon the working parts of the engine than if forced, with the velocity of impact, upon the surface of a greatly enlarged piston, as in the case of the single-cylinder condensing engine. This, to a certain extent, is correct, only it does not effect the economy but simply the strength of the working parts of the engine. Again, it is stated that the double-cylinder engine produces from the same cause a more uniform motion than the single-cylinder engine. But the advocates for the single-cylinder system affirm that these objects are all attained, first, by cutting off the steam at a point that will produce the same rate of expansion as in the compound engine, and this, although suddenly effected, is fully compensated by the action of the fly-wheel, at the greatly increased speed of the engine. We have been the more particular in this description, as the question is not yet settled amongst practical men which of the two systems is the best; each side has its advocates, with proofs which they adduce in confirmation of their respective theories. Without entering further into this question, we may, however, state that we would prefer the single-cylinder engine, where the advantages are the same as those of a more complicated form; for it appears to us that no benefit is gained in the shape of economy by the double or the compound engine; on the contrary, we are inclined to believe there is a loss in the former, owing to the difficulty of working them together as one engine. The same reasoning will apply to what is called the McNaught principle, which consists in placing a high-pressure cylinder at half-stroke, under the main working beam of the ordinary condensing engine, and exhausting the steam from one cylinder to the other, on the same principle as already described in the double, horizontal, and vertical system."

[Comparatively few of these engines have been constructed or are in use in America at the present time; and these, although identical in principle with those described by Mr. Fairbairn, have the application of the idea in a very different form. The results derived from their use were not balanced by the expense of running and keeping them in repair.]

"Having described the different forms and conditions of our stationary engines, and the improvements that have been effected by the introduction of high-pressure steam worked expansively, we may conclude this part of the subject by observing, that we are far from arriving at that point of economy in the use of steam which an increased pressure and a still greater expansion is calculated to attain. It is true that the danger of explosion may be increased, and so it would be with our present means; but in our locomotive engines we already work steam at 200lb. pressure on the square inch with greater safety than is done in our stationary engines at a reduced pressure; it is, therefore, evident that we are behind in this department, and a wide field is still open for improvement. It is not our province in this article to point out how this can be accomplished, but we may safely affirm that the improvements already attained are only the precursors of others of much greater importance in the economy and use of steam."

French Gunnery Experiments.

The report which we were recently enabled to furnish of the gunnery experiments in France, and the successful piercing of iron plates, having excited considerable discussion in naval and military circles, we now subjoin some further details which may be of interest. The gun used is built entirely of steel, and composed of several tubes of that metal, put together in the method introduced in France by Colonel Treuille de Beaulieu, but better known in England as "Blakely's plan," and which secures the simultaneous action of all the tubes in resisting the bursting force of the powder. The gun weighs only four tuns three-quarters and a few pounds, or nearly three tuns less than the Armstrong gun, rifled on the Whitworth plan. The French gun is rifled with three grooves, less than a quarter of an inch deep. The twist of the rifling is uniform, one turn in 30 calibers, being a slightly quicker turn than that used by Armstrong, and a little slower than that used by Caselli and Whitworth. The gun, when last heard of, had been fired 800 times without injury. The shell weighs 45 kilogrammes or between 99 and 100 pounds. The service charge of powder is 12½ kilogrammes or about 28 pounds, although in some cases 15 kilogrammes (38 pounds) of powder were fired. With reference to the question of the introduction of flat-headed projectiles, it is perhaps scarcely necessary to mention that they were first brought into public notice by Captain Norton, in 1852, and were described by him as "punch-headed iron shells." The gallant captain, with more modesty than other inventors, did not, however, claim for his shell the advantage of novelty, but only the merit of rendering it applicable to modern artillery.—*London Globe.*

Arsenic in Bismuth Preparations.

The metal bismuth is extensively used in medical preparations, and to a large extent it contains arsenic in sufficient quantities to render its use dangerous. Dr. W. B. Herapath, the distinguished English chemist, states in a communication to the *Chemical News* that he has lately examined fourteen samples of bismuth obtained from several hospitals and the first pharmaceutical establishment in London, and he detected arsenic in them all. Some of these samples contains as much as one grain of arsenic to 43 grains of bismuth. Such quantities of arsenic, although minute when given in usual medicinal doses, yet, under certain circumstances, may lead to serious consequences.

The following is the mode described by Dr. Herapath for obtaining pure bismuth preparations by the removal of any arsenic they may contain:—Boil any of the insoluble salts of bismuth in caustic potassa or caustic soda, and the arsenic will be removed in a soluble form. When this operation is repeated and the residue washed with large quantities of water and decantation, the bismuth preparation will be perfectly pure for medicinal purposes. Both the nitrate and carbonate of bismuth containing arsenic have been purified by this mode of treatment.

Stuffing Leather.

A correspondent of the *Shoe and Leather Reporter* says:—"I am in favor of using a wheel for stuffing leather when weight is desired, and believe that not only is weight added but the quality of the leather improved. I would recommend using stuffing made with a large part tallow, applied hot, the leather put into the wheel as soon as the hot stuffing is applied, and run in the wheel from one-half to three-quarters of an hour. The stuffing should be applied to both sides of the leather. After the leather is 'wheeled' sufficiently, it is well to pack it in a box or keep it from the air for a day or two, and then put out in the usual way, and have as much stuffing applied as the leather will need, using cold stuffing and soften if thought advisable. I have no doubt but upper and kip leather would be much improved in quality by this process, but it would make it more expensive than the usual way. The leather should be semi-dried before the hot stuffing is applied. I do not think my views of stuffing leather are entirely new; but very few tanners, however, use a wheel, and many wholly reject the idea."

Be Cheerful at your Meals.

The benefit derived from food taken, depends very much upon the condition of the body while eating. If taken in a moody, cross, or despairing condition of the mind, digestion is much less perfect and slower than when taken with a cheerful disposition. The very rapid and silent eating, too common among Americans, should be avoided, and some topic of interest introduced at meals that all may partake in, and if a hearty laugh is occasionally indulged in, it will be all the better.

It is not uncommon that a person dining in pleasant and social company can eat and digest well that which, when eaten alone and the mind absorbed in some deep study or brooding over cares and disappointments, would be long undigested in the stomach, causing disarrangement and pain, and if much indulged in, become the cause of permanent and irreparable injury to the system.

The cotton in the cushions of the new church at Naugatuck, Conn., is to be sold and replaced by hair. The society will make $600 by the operation, which will be used to pay a portion of their debt.

VALUABLE RECEIPTS.

OILS AND VEHICLES FOR PAINTS.—Linseed oil is undoubtedly the best vehicle for paints that are to be exposed to the weather. It absorbs oxygen and becomes solid and waterproof, and yet it always possesses some elasticity which prevents it from cracking. Oils contain a considerable portion of glycerine, which is hygroscopic fat. It has been found that some metallic oxides possess the quality of combining with glycerine in the oil, and rendering it susceptible of readily drying in the atmosphere. The oxide of lead, sulphate of zinc, and the oxide of manganese, boiled with oils, communicate to them great drying properties, and for this reason oils treated in this manner are called *drying oils*, and are in common use. Some works recommend the use of both sulphate of zinc and the acetate of lead mixed together for making drying oil. These two metallic salts, when brought together produce two new compounds by double decomposition, namely, the acetate of zinc and the sulphate of lead, and the oil is restored to its original condition. The acetate of zinc should never be employed in paints, because it is a bad drier. The drying linseed oil has such an an affinity for oxygen as to promote chemical union with it and the coloring pigment, and thus destroy the beauty of the color. There are many delicate pigments which cannot be employed with oil in paint, without suffering injury. This is the case with chrome yellow, verdigris, gamboge, and a number of the lakes. But wax is a very useful corrective for this deteriorating quality of the oil. Wax is a powerful antiseptic, and has great preservative powers. Added to painters' varnishes it tends to prevent them cracking—an evil which has destroyed the beauty of many excellent works of art. It is said that Titian painted on a red ground, and imbued his canvas at the back with beeswax dissolved in oil. Bleached wax is easily dissolved in hot oils, both volatile and fixed; it is not changed by exposure to the atmosphere, and is but very feebly acted upon by the strongest acids. Its appropriateness, therefore, as a vehicle for paints is self-evident. Many persons mix shellac varnish with common paint in order to render the latter less expensive, because a considerable quantity of water can be added to the varnish and combined with the paint. Thus, if we take three ounces of the bi-carbonate of soda, and place it in three pints of soft water, it will dissolve a pound of gum shellac by boiling, thus making a lac varnish. To this is usually added half a pint of alcohol and two quarts of soft water, and it is then mixed with common oil paint. For inside work in houses it may answer, but it should never be applied to the outside of buildings, because it cannot resist atmospheric influences like paint which contains only oil and a pigment. Gum shellac varnish made with the carbonate of soda does not stand the action of rain so well as varnish for which alcohol has been employed as a solvent. It should, therefore, never be used for any work exposed to the weather. In *Cosmos* it is stated that M. Oudry, of Auteuil, France, has found that benzine and coal oil are the best vehicles for paints of metallic basis (lead, zinc, &c.), as they dry rapidly and have no smell after the first twenty-four hours.

Manufacture of Wrought Iron direct from the Ore.

The following is an extract from Truran's "Iron Manufacture of Great Britain." It is of much interest to all our iron manufacturers:—

"The production of wrought-iron direct from the ore—the original mode of manufacturing—has engaged the attention of numerous practical and scientific men, and is practiced to a limited extent abroad; but the attempts made to reinstate it in this country have hitherto been, commercially speaking, unsuccessful; and though the ores and fuels we possess are unquestionably superior to the foreign for this purpose, fusion in the blast furnace and conversion into malleable iron by the puddling process are pursued with all the bar-iron now manufactured.

"The conversion direct into malleable iron dispenses with the blast furnace and appendages, and the intermediate processes of refining and puddling, and if successful, should result in the production of a finished bar of superior quality, with a smaller consumption of ore at a proportionately lower cost. In all experiments on converting on this plan, the bar is of inferior quality, the consumption of ore larger, and the cost of production augmented over that attending the manufacture by blast furnaces and refineries. The causes tending to produce this difference between the results of theory and practice are numerous, but will receive from us only a brief notice.

"The ore to be converted is ground to a coarse powder, and in mixture with a quantity of carbonaceous matter similarly divided, is charged into a reverberatory furnace not unlike the ordinary puddling furnace. The draught is forced to the production of a high temperature, reducing the ore to a semi-liquid state, when by dexterous manipulation on the part of the operative, metallic iron is separated from the extraneous matter, balled up, and shingled as in the usual manner. The theory of this operation is simple. The carbon of the carbonaceous matter is consumed by uniting with the oxygen of the ore, and the metal is left free to agglutinate into a mass. The Beaufort black band was thus converted into malleable iron, though after a few experimental trials the operation was discontinued. The principal objection to its extensive adoption seems to lie in the difficulty of effecting a complete separation of the extraneous metalloids of the ore. In the blast furnace it is accomplished by mechanical subsidation in the hearth and the extraction of the metallic iron from the low level; in the direct mode of manufacturing it is effected, to a certain degree, by severe manual labor, which, being skilled, commands a comparatively high price, and materially enhances the expenses incident to the process.

"The prolonged exposure of the metallic iron to the oxidizing influence of the flame and gases, during the process of separation from the alloyed matters, results in a considerable waste of metal, and accounts for the comparatively inferior yields.

"To obviate this loss, and to economise the fuel and labor demanded, the ground ore and carbonaceous matter have been subjected to the necessary heat in a closed supplementary chamber, whereby the combustion of the carbon is slowly carried on at the expense of the oxygen of the ore, but at a sufficiently low temperature to avoid oxidizing the mass. From this chamber it is drawn as required into the furnace, balled up and shingled; the deoxidized ore agglutinating without undergoing the puddling process, which, being essentially a decarburizing process, is unnecessary with the minimum volume of carbon consumed in the deoxydation of the ore in the close chamber.

"Ground carbonaceous ore may be substituted for the carbonaceous matter, and mixed in the necessary proportions with the same ore calcined, or with raw hermanite, the deoxidation can be effected without the usual ground coal, at a corresponding reduction in the expense. In this respect, the possession of ores of such varied character, gives the ironmasters of this country an important advantage over their foreign compeers; and, should this mode of manufacture, at some future day, become more profitable than at present, would enable them to maintain their supremacy in the trade. The rich carbonaceous ores of Scotland or Wales, mixed with the hematites of Lancashire or West Cumberland, or other similar ores, reduced in suitably-constructed furnaces, may be converted into malleable iron, at costs considerably under those incurred with the blast furnaces and subsequent decarburizing system.

"With existing modes of operation, the advantages of direct conversion are principally confined to the comparatively small capital required to establish the manufacture, which may be on the smallest scale, yet, to a corresponding extent, profitable. Hence it is especially applicable to new districts, requiring an immediate small supply, and to countries deficient in the capital necessary for carrying on operations on a large scale with blast furnaces, and attendant refining and puddling furnaces. To establish on a sound basis works consisting of blast furnaces, refineries, puddling forges, and rolling mills, a capital of at least £20,000 per blast furnace, where there are four, is required; with a fewer number, more. In the direct mode wrought-iron in proportionately smaller quantity may be manufactured, with a capital of only one-twentieth or one-thirtieth of that sum. In this respect, therefore, it is more advantageous, and may consequently, under certain circumstances, merit the preference over the established system."

The Work and Fate of the Sun.

The following is an interesting extract from a lecture of Rev. W. Leitch, D. D., of Queen's College, Canada:—

"Almost all the mechanical power on the face of the earth is traced to the sun. The sum of force in the universe is always the same, just as the sum of matter is always the same. The force may change its form, but its amount is always the same. This principle is known by the name of correlation of physical force. When the river leaps over the Niagara Falls and reaches the level beneath, its mechanical force is lost as to form, but it is transmuted into heat. The water at the bottom of the fall is increased in temperature, and were this heat collected it would be converted into mechanical power, exactly adequate to raise the water to its former level. The heat of explosion is converted into mechanical power when the ball is impelled from a gun. The mechanical power is reconverted into heat when the ball is suddenly arrested in its flight. The ball will be found to be hot exactly in proportion to its velocity when arrested. Now this is the case with the sun's heat. All the mechanical power employed by man can be traced to the sun. The water-wheel is turned by the sun. Its heat raises the water from the ocean and deposits it in the form of rain on the mountain's side. The river collects the rain, fills the buckets of the water-wheel, and by this process the sun indirectly works the machinery of the mill. The steam engine is not an exception. Its power is derived from the heat of the furnace, but the furnace depends for its power on fuel. But how should fuel possess this power? It has derived it from the sun. The fuel as growing wood stored up the power dispensed by the sun. The tree is the concentrated power of many summers' heat, and, though it may lie for thousands of years as coal in the bowels of the earth, it retains the power till it is evolved by burning. But you will say that animal power is surely different? Such is not the case. Every exercise of animal power costs some waste of tissue; that tissue is ultimately derived from vegetable matter, and the vegetable matter owes its power to the rays of the sun. Volition cannot create mechanical power; it can only direct and apply it. The only power not derived from the sun is that of the rise and fall of the tide, as far as this is due to the moon. The trade winds may also be regarded as an exception. This power is derived from the rotation of the earth, though the heat of the sun is necessary to develop the power. But the sun's fuel is limited, and the combustion must at last cease. The researches of the German chemists lead to the conclusion that the photosphere is fluid not gaseous. It cannot be conceived a continuous solid. It is also probable that the region of the incandescent metals in the state of vapor is the rose-colored stratum seen in total eclipses. Science has distinctly traced the doom written on the solar system. It is destined to pass away. The machine is running down. The central fire will at last be exhausted. The planets and satellites in their spiral courses will come to a standstill. But are we to arrive at the conclusion that God's glory shall no longer be manifested in the heavens? or that this system is to rush into annihilation? No, there is no ground in science for the belief that a single particle of matter will ever be annihilated; but there is every ground for the belief that the passing away of the solar system is only one phase of some grander revolution, and that from the ashes of the present system more glorious worlds and systems may arise. All this is in perfect, almost literal, accordance with the Scriptures, which represent the heavens passing away as a scroll. 'They shall wax old as a garment; as a vesture shalt thou change them, and they shall be changed.' It represents the phenomenal world as ever changing—in a state of unceasing fluctuation—while the great absolute I AM remains ever the same!"

THE copper shoe-tips, now so extensively used for children's shoes, are manufactured at Lewiston, Maine. Three million pair of tips are turned out annually at the factory.

IN France every steam boiler is required by law to be furnished with a safety plug of fusible metal. It is composed of tin, 8 parts; lead, 2; bismuth, 4.

Correspondence

The Distillery Business.

Messrs. Editors:—I desire to communicate some observations on a subject of high importance to that part of the community who are connected with the distilling business. An intimate acquaintance with it as it is conducted in the United States and in Germany, obtained in the course of an active participation in the business during a period of more than 25 years, has led me to believe that, by the exertion of proper care, a larger quantity and better quality of whisky may be produced, and that many tried improvements may be introduced in the mode of making whisky. To show that this statement is not an empty assertion, unsustained by proof, I have prepared the following account of the changes which I deem it expedient to introduce in the usual method of distilling whisky, and offer it to the consideration of the manufacturers. I know that prejudice opposes every innovation and clings fondly to old practices; but in a country where competition is so earnest, and enterprise so surely rewarded, I may hope that my suggestions will meet with a just appreciation.

If the readers of the Scientific American will bear in mind that a distillery is a laboratory, where many processes, not merely of a mechanical but still more of a chemical nature, have to be performed, they will easily perceive of how much importance to the distiller must be a deeper knowledge of the different processes, a high degree of promptitude, skill and care, and that the management of a distillery requires much more theoretical and practical knowledge than distillers generally suppose. Most distillers have some favorite method in making their malt, mashes, yeast, &c., and many are not willing to depart from it, either because they are "afraid to incur new expenses in making experiments which may turn out to be failures," or because they "fear to be deceived." But the art of distilling, though long practiced, has, as I propose to show in the following four articles, not been carried to that degree of perfection which should be expected. This is not surprising when we consider that most distillers proceed in the same beaten track, construct their distilleries as their neighbors, without supposing the art capable of improvement or possessing the firm will to improve it. Some may not give themselves the trouble to observe the different processes daily performed with a more minute and theoretical eye. There are many, also, who imagine the art of distilling to be very difficult, or that it requires a long time to comprehend it, and some, again, consider it a very simple business. They, therefore, continue the old way and process without making any progress, being rather contented with what they get. But a prudent, rational and artificial management and practical use of a distillery, with the introduction of tried and useful improvements, based on scientific principles, will render the business of distilling much more facile, certain and profitable, than it is at present.

In examining distilleries—and I have examined a large number to justify me in coming to general conclusions—I found nearly all of them established and worked on the old plan, without reference to the highest profit or the greatest economy, and leaving out of consideration all those excellent and decided improvements which have been achieved in this field of industry during later years. Sometimes I found that there was not even a supply of that most indispensable material in a distillery, cool and soft water, so that the distiller was altogether unable to cool the mash or yeast down to the necessary degree for fermentation, and, as to the soft water, to secure a good and perfect dextrinefication and saccharification. Water, containing 25 grains of salt—magnesia, carbonate of lime (chalk), sulphate of lime (gypsum), chloride of sodium (common salt), sulphate of soda, sulphur, iron in various forms, &c.—to a pound, is not to be recommended. The kind of water usually called hard water, containing particles of lime, magnesia and gypsum, affects both saccharification and fermentation considerably. Lime, in combination with carbonic acid (carbonate), and with sulphuric acid (sulphate) is the most abundant substance in the water. During the process of washing, a portion of the lime, &c., forms a chemical composition with starch, on account of certain acids present, while another portion of the lime, which is precipitated, forms an insoluble cover mechanically around the fermentable substances. In this way the necessary compliance with the conditions effecting transformation is made impossible. A very simple process, however, will improve such water considerably. Water which contains much lime becomes somewhat milky when boiled, and bears a sediment when at rest, after being boiled. "It therefore," says an eminent chemist, "will be made much softer and purer by boiling at first, for the purpose merely to precipitate the lime. Well and pond water sometimes contain vegetable substances. When boiled, the organic matter coagulates, and when the water cools, separates in flocks, leaving the water nearly free from taste and smell. The same purification takes place when the water is filtered through charcoal, or when chips of oak-wood are put into it. These properties of being coagulated by boiling, and by the tannin of the oak-wood, show that the organic matter contained in the water is of an albuminous character. In coagulating these substances they embrace the other impurities and carry them down along with them." Ice must sometimes be used to cool the mash or yeast down during the warm season. Here I may state that one pound of ice, mixed with one pound of water at 167° Fah., will give two pounds of water of about 31° Fah.; or, in other words, one pound of ice requires 135 units of warmth to be changed into water.

As a fermenting yeast I found everywhere still sweet hops yeast, in various forms, in use. In other countries—such as Germany—this kind of yeast has long since been abandoned for a much better ferment, from the fact that it but poorly answers its purpose. Concentrations, in form of "boil-downs," have been made for the purpose of strengthening this kind of yeast. The yeast that has been substituted for it is lactic-acid yeast, and it so well meets the requirements of the distiller that no other kind of yeast has been for years in use there, and it should be used to the exclusion of all other ferments. Whatever may be said to contradict the superiority of lactic-acid yeast, it will suffice to state that German distillers have to pay for 20 quarts of fermenting beer a duty of about twelve cents, and this has been a motive with them to improve the method of mashing, malting, saccharifying and, above all, of making yeast so as to obtain the highest possible yield and the cheapest whisky by as small expenses as possible and producing the richest food for fattening. There is hardly a single kind of yeast now used in this country that has not been made and used for many years in the old country; but as a long experience has demonstrated that there is no kind of yeast by which such a high yield can possibly be procured as by the use of lactic-acid yeast, this kind is the only one now used there.

Again, I may state that I have generally found a very poor quality of dried malt, which appeared to have neither grown nor dried in the proper manner, thereby weakening its property of forming sugar and preventing it from producing a perfect saccharine fermentation. I have never yet found in any distillery that small apparatus, connected with the lowest chamber of the still, which is used to indicate the very moment when the beer of the lowest chamber has no more alcohol. To run a still but one minute after all the alcohol contained in the beer of the lowest chamber has evaporated, would be wasting time and fuel, and weakening the proof of the whisky; while, to discharge the lowest chamber before it has been surely ascertained whether all the whisky contained in it has evaporated or not, would frequently prove equivalent to an absolute loss of whisky. Both occurrences are often experienced by distillers. Hence the great propriety of introducing the simple apparatus which I have referred to.

Many distillers use shipstuff or shorts as a portion of the mash. Now, it is well known that seeds, fruits, roots, leaves, woody fiber, paper, raw cotton, flax, cotton and linen rags and sawdust contain starch just as well as shipstuff. The quantity of starch in shipstuff—not to mention the inferior quality of whisky which it produces, on account of the great quantity of the poisonous volatile or fusel oil contained in the abundantly-furnished skin or epidermis of the wheat, bran—is very insignificant; still they continue to pay a very high price for it, and the question naturally arises, is it more profitable to mash corn with a portion of shipstuff, sawdust or rye? The labor and the expense are the same, the wear and tear of the machinery are the same. Why then do we not mash sawdust with corn, instead of shipstuff as small grain? We should say here that rye, as small grain for the mash, is preferable to any other grain, not only because it contains a great deal of amylaceous matter, but a large quantity of gluten or vegetable albumen, easily soluble in water. The small or tail grain, which is separated from the grain before brought in the market, is richer in gluten than the full-grown grain. Now, it is certain that the ferment is formed from the gluten at the same time that the transformation of the sugar by the fermentation is effected. Gluten, as is well known, contains a great deal of nitrogen, which is the very substance required for a ferment, and hence the use of rye to a portion of the mash will increase the yield, not only on account of its amylaceous matter, but by its simultaneous and considerable promotion of the fermentation also. A correct proportion of rye, therefore, mixed with corn in the mash, must necessarily produce the highest yield and the cheapest whisky.

After many years' experience, I am prepared to say that an average of at least 18½ quarts of proof whisky per bushel of 55 pounds can be run with ease and certainty all the year around, provided the distillery is conducted, managed and constructed in the manner hereinafter indicated. It is well known that the distillers in Prussia, as a general thing, run from every pound of starch contained in rye, wheat or potatoes, 25 per cent of alcohol after Tralle's hydrometer. As one bushel of corn contains about 44 pounds of starch, it should yield, therefore, 22 quarts of proof whisky—because 2 pounds of starch should yield 50 per cent of whisky after Tralle's, that is to say, one quart of proof whisky. This, it is our conviction and belief, could and should be made; and we have run, as our highest yield, something over 21 quarts in a distillery of this country—not by "accident that could not be accounted for," but by correct weight, measure and proof.

But, to proceed to the manufacturing of whisky. In order to enable the readers of the Scientific American to form a clear conception of what I may have to say, I will speak of the manufacture of whisky under four distinct headings. The process of making whisky is divided as follows:—1st, Malting; 2d, Saccharification; 3d, Fermentation; 4th, Distillation.

[To be continued.]

Coffee and its Substitutes.

Messrs. Editors:—The attentive looker-on must have observed that the ring-leaders of a confederacy, without ports or commercial marine, have enacted to admit coffee free of duty. Such a discrimination cannot conflict with any American interest. Tea may some day be profitably produced in those parts of the Gulf States distant from the sea, if some Yankee will invent machinery for the necessary manipulation, but coffee will never be grown there. That aromatic berry, which takes the place of very objectionable stimulants, is well known to be a tropical production—the best variety hailing from the hottest part of the known globe. It may safely be asserted that two years' experience of every imaginable substitute for it has extorted the exclamation: "Miserable comforters are ye all!" G. H. Knight.

Cincinnati, Ohio, Feb. 16, 1863.

The Oil Trade.—The Pittsburgh *Chronicle* says:—Since the establishment of the "Oil Exchange" we e enabled to obtain, with much more accuracy and agularity than before, the receipts and shipments of etroleum from this point. The shipments east by ehe Pennsylvania Railroad, from February 2d to February 11th, inclusive, amount to 28,751 barrels. The receipts of crude oil, on Wednesday, 11th in t, were 937 barrels from Oil Creek, and 101 barrels from Kanawha, making in all 1,038 barrels. During the year ending February 1st, over 220,000 barre's of crude oil were landed at the Alleghany wharf, the great bulk of which was sent east by the Pennsylvania Railroad."

California Mining in 1862.

The *Mercantile Gazette and Prices Current*, of San Francisco, publishes an interesting abstract of the progress and condition of mining in California during the past year. It says :—"During the past year the operations in gold mining have usually been attended with fair average success. The gradual diminution of the yield of the older fields has been compensated by the new discoveries that have been made in other vicinities, so that the total gold product of the year has probably fallen but little, if at all, behind that of the past four or five seasons."

HYDRAULIC ENGINEERING.—California is the most extraordinary country in the world for hydraulic engineering connected with gold mining. Some of the hydraulic works are stupendous in magnitude, and they exhibit great originality of genius, enterprise and daring. The following extracts from our cotemporary, on this head, are of decided interest :—

"At Michigan Bluff, midway between Downieville and Placerville, on the North Branch of the Middle Fork of the American river, hydraulic mining has been vigorously and successfully prosecuted. Owing to the formation of the land, the sluices are laid in long tunnels, 100 feet under ground. The water is carried in iron pipes upwards of 3,000 feet, and has a fall of 300 feet. Seven of such tunnels were in use in June, and more than a dozen others were shortly to be commenced to work other claims.

"In Siskiyou, along Scott river and its vicinity, the yield was larger than for several years past, and a number of rich claims were mentioned, in one of which a $450 nugget was found. The river claims were worked very extensively, the number of water wheels erected being greater than ever before.

"At French Corral, in Pollard's claim, in March last, a tunnel 2,800 feet long was completed after two years' labor. Seventy-five men were employed and 800 inches of water used in the claim, and $5,000 $17,000 and $20,000 were cleaned up at different times after operations commenced."

AMALGAMATING.—The only improvement noted during the past year in this class of mining was a greater saving of the gold in the shape of amalgam taken from the riffles and amalgamated coppers of sluices by means of nitric acid. It has been found that what was formerly regarded as refuse and thrown away, if slowly evaporated, frequently still yields a considerable quantity of gold. The Columbia Fluming Company thus save sufficient to pay the salary of their superintendent.

BLASTING.—At Smartsville, in Bradley's hydraulic claim, in October, a blast of 500 kegs of powder was fired, for the purpose of pulverizing the hard cemented gravel, and preparing it for washing. The bank was 85 feet in hight. From this a tunnel 190 feet in length was run, with seven side drifts of 10 to 15 feet long. In these the powder was deposited, and five lines of fuse carried thence to the entrance. For a distance of 75 feet from the entrance, the tunnel was then tightly closed, and packed or "tamped" with earth. When the explosion occurred, the hill, for a distance of 300 feet front and rear, and from the bed rock to the surface—a depth of from 85 to 120 feet, composed principally of hard grey and blue cement—was thoroughly pulverized, and the surface thrown in ridges, as though newly plowed. The cost of the blast was $3,300. The saving of labor was about 30 per cent. To wash the soil thus prepared would require a stream of 400 inches of water for over three months, for which the outlay would be $5,000, and $1,500 more would be expended for the labor required. $20,000 was refused for the product.

PRODUCT OF GOLD AND QUICKSILVER.—The total value of the treasure obtained from all the California mines in 1862 was $42,539,799, of which $4,989,921 were coined in San Francisco. In 1861 the total value was $41,689,077 ; in 1860, $45,211,693. The quicksilver product of California mines is prodigious. Last year it amounted to 3,025,875 lbs.; most of this was exported.

A COMPLIMENT TO AN AMERICAN.—The Paris journals announce that, at the annual sitting of the Imperial Academy of Sciences, on January 3d, the celebrated La Lande prize of astronomy was awarded to Alvan Clark, Esq., of Cambridge, Mass., for the discovery of the new star near "Sirius," with the great reflecting telescope recently made by him.

Tropical Vegetation on the Amazon.

The magical beauty of tropical vegetation reveals itself in all its glory to the traveler who steers his boat through the solitudes of those aquatic mazes. Here the forest forms a canopy over his head ; there it opens, allowing the sunshine to disclose the secrets of the wilderness ; while on either side the eye penetrates through beautiful vistas into the depths of the woods. Sometimes, on a higher spot of ground, a clump of trees forms an island worthy of Eden. A chaos of bushropes and creepers flings its garlands of gay flowers over the forest, and fills the air with the sweetest odor. Numerous birds, partly rivaling in beauty of color the passifloras and bignonias of those hanging gardens, animate the banks of the lagune, while gaudy macaws perch on the loftiest trees ; and, as if to remind me that death is not banished from this scene of paradise, a dark-robed vulture screeches through the woods, or an alligator rests, like a black log of wood or a sombre rock, on the tranquil waters. Well he knows that food will not be wanting ; for river tortoises and large fish are fond of retiring to these lagunes. . . . If the Nile, so remarkable for its historical recollections which carry us far back into the bygone ages, and the Thames, unparalleled by the greatness of a commerce which far eclipses that of ancient Carthage or Tyre, may justly be called the rivers of the past and the present, the Amazon has equal claims to be called the stream of the future ; for a more splendid field nowhere lies open to the enterprise of man.—*The Tropical World.*

Platinum-pointed Lightning-rods.

Either gold, silver, copper or iron when used on the upper extremity of a lightning-rod will fuse under a heavy discharge of the electric fluid. Any of these metals, therefore, is inherently defective for use in pointing lightning conductors. We have had brought to our notice lately a new lightning-rod, manufactured by H. Jarecki, of Erie, Pa., which obviates this evil. The upper section of the rod is about twelve inches in length and is composed of copper, with a socket into which the main portion of the rod is screwed. To the extreme point of the copper portion is attached a conical cap of platinum about half an inch in length ; and below this the copper rod is gilt for about six inches of its length. As the electric fluid will not fuse the platinum point, complete protection is afforded to the extremity of the rod which the action of lightning cannot injure, and as the gilt upper section of the rod is not liable to corrode, we think the invention of Mr. Jarecki a good one, and we would refer parties desiring further information to his advertisement on another page.

British Exports and Imports.

In a speech lately made by the Hon. Milner Gibson at Ashton, England, he presented some interesting statistics respecting the trade and manufactures of Great Britain. In 1862 there were 11,632,000 quarters (93,056,000 bushels) of foreign wheat and flour imported and consumed in England, against 8,748,000 quarters in 1861. One-third of this was obtained from America. In relation to the British paper manufacture he stated that 18,084 tuns of rags were imported in 1862, against 15,308 in 1861, thus showing that the paper trade had increased in activity. The total value of British exports in 1862 was £123,000,000 ($615,000,000), against £125,000,000 in 1861 and £136,000,000 in 1860. The falling-off was in cotton goods ; there had been an increase of all other manufactures. The amount of cotton yarn exported was 91,500,000 lbs., against 178,000,000 lbs. in 1861 and in 1860 of 197,000,000 lbs.; showing a decrease of 115 per cent of cotton exports in two years. The value of exports to the United States in 1862 was £13,500,000 ($67,500,000) against £9,000,000 in 1861, and £21,600,000 in 1860.

THE Troy (N. Y.) *Times* publishes a long list of improvements made in the "burnt district" of that city. During the past eight months about two hundred and forty buildings have been erected there, at a cost of nearly $1,000,000. The improvements elsewhere are estimated at $300,000, making a grand total of $1,300,000 expended for building in that city during the period named.

Diamond Dust for Machinists' Use.

It is well known to machinists and other metal-workers that exigencies sometimes arise when the ordinary tools and agents used for cutting or grinding steel and iron are unavailable, and that much valuable time is lost in futile attempts to fit work together that has been sprung in hardening. It seems to us that diamond dust, which is employed by jewelers and lapidaries for cutting jewels, would be very serviceable for this purpose. The cost would on a superficial judgment seem to be an obstacle to its introduction, but we do not think it is. In the first place, the diamond dust works quicker than emery, corundum, or ground glass, and does much better work ; and though the first cost of the diamond dust may exceed that of the other agents named, the difference in time and the better quality of the work would we think fully compensate for it. When work is case-hardened properly, it has a film upon the outside which cannot be cut except with great difficulty ; even emery sometimes fails on it, but in the diamond dust we have a medium whereby we can reduce the most intractable jobs to submission in a very short time. We think a trial of it, in extraordinary emergencies only, will prove its value to our metal-workers.

"Confidence Men."

Our readers may have noticed advertisements in the daily papers, from physicians and others, "whose sands of life are nearly run out," purporting to cure consumption, &c., without charge to the patient ; these men are "confidence operators." We cut from the *Druggists' Circular* the following account of their mode of operation :—

"It is needless to say that we cannot attempt to unfathom the mystery surrounding these impossible drugs. We call the attention of our readers, however, to one of the most heartless impositions that can be practiced on the suffering. These recipes are advertised generally by self-styled 'doctors,' stating that they are sent gratis on application. The recipe is sent for and received. Inasmuch as several of the ingredients mentioned cannot be had of the druggists, the advertiser is again written to by the real or imagined sufferer, and the result of the correspondence is that the 'doctor' receives from one to two dollars or more for a parcel of compost, which any druggist can put up for a shilling."

Steering Vessels by Steam Propulsion.

An experiment was, by order of the Lords of the Admiralty, tried on Monday, at Keyham Basin, Devonport, on board the gunboat *Jackdaw*. Pipes of above a foot in diameter have been fitted to the vessel, one on each side, having communication below the water-line amidships and at the bows. The ship was lashed about the waist to a buoy, and the valves connected with the pipes having been opened, the force of the steam of the ship's engines was brought on each pipe alternately, so as to drive the water out at the bow and cause the ship's head to turn in the contrary direction, which is the object of the invention. The experiment is said to have been successful.

The above is from a British paper. A plan nearly similar in its character, for steering vessels, was communicated about two years ago to both the American and British naval authorities by an inventor residing in South Acton, Mass. It would be a great advantage to vessels-of-war if they could be steered with a current of water driven out below the water line at the stern, through adjustable tubes, so as to dispense with the helm entirely. Such a method of steering would be beyond injury from shot.

COTTON GOODS FROM CHINA.—A vessel has arrived at San Francisco from China, with a cargo of seven hundred bales of cotton goods (drills and sheetings), which has created the erroneous impression, in some quarters, that the goods were manufactured in China. They were, of course, manufactured either in this country or England and shipped to China, whence they are being re-shipped to this country, in consequence of the wonderfully high prices prevailing here, which affords a better market than China.

JAPANESE TEA.—A cargo of Japanese tea lately arrived at this port in the bark *Benefactor*. It consisted of 14,366 packages. This is the second cargo of tea from Japan that has come to New York. In flavor it is said to resemble the finest China green teas, and in its preparation no artificial heat is used, and it is not colored with indigo like the teas that are made up for market in China.

Improved Burial-case.

In the present condition of the country, when the fatal calamities of war render it a duty incumbent on fathers, mothers, wives, sisters and brothers to seek their dead upon the battle-field and to bring home for burial the remains of their kindred, any invention which will tend to ameliorate these afflictions and assist in the performance of this sad duty is worthy of special notice, and to that end we present to our readers an illustration of the new burial-case recently introduced by Dr. G. W. Scollay, of St. Louis, Mo. The great simplicity of its mechanical application is one of its principal characteristics.

As soon as a body begins to decompose, a gas is evolved which is very offensive, infectious and detrimental to the health of all persons who may inhale it. The human body also undergoes other changes, the details of which are obvious to all. These changes, severally and collectively, are alike obnoxious to the senses and dangerous to the health of attendants and others who are necessarily present. If decomposition is not prevented in some way it manifests itself in an exceedingly unpleasant manner, either by bursting the case or by escaping, as previously-mentioned, into the room where the body is placed. These difficulties Dr. Scollay has most successfully overcome by the production of this burial-case or coffin. By means of a composition applied as an interior lining, he has rendered the wood sufficiently impervious to retain the fluids arising from the decomposition of the body; and also by the application of a chemical compound and a combination of self-acting and self-adjusting valves, by which the gases generated can be controlled in such a manner as to thoroughly prevent the destruction of the coffin when properly constructed to exclude the air, and also to render it innocuous and inoffensive to the health and nostrils. The features of the deceased person also retain a remarkable degree of preservation for a period of two or three weeks.

Fig. 1

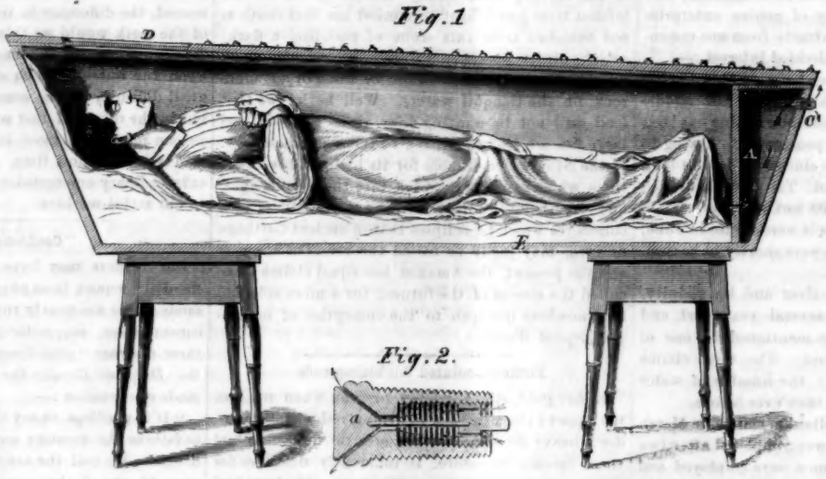


Fig. 2.

SCOLLAY'S PATENT AIR-TIGHT DEODORIZING BURIAL-CASE.

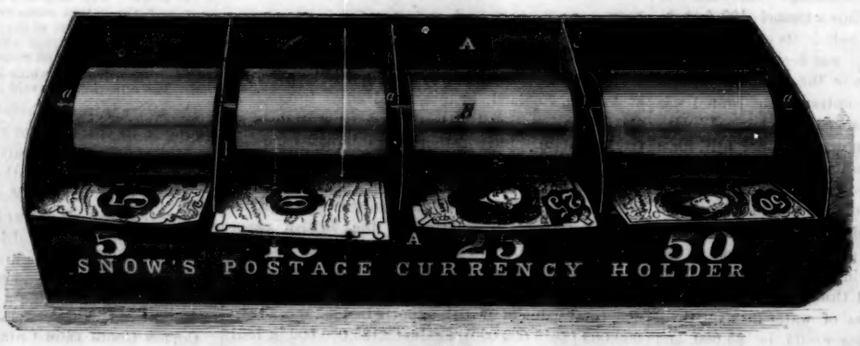
The above figure represents a longitudinal section taken through the center of one of these cases, showing the lid on. A is the deodorizing compartment or chamber, which contains the chemical compound; *a* an aperture in the deodorizing chamber, through which the noxious gases enter; C is the self-adjusting elastic valve, by which they escape. D is the glass face to the burial case, and E is the air and water-tight patent lining. The valve shown in Fig. 2, and also at C, is made of bone and has a thread on the outside by which it is secured. There are small apertures in the end, shown by the arrows, and the confined gases escape through them when the pressure is sufficiently great to force out the cone, *a*; this cone has an elastic cord at its apex which brings it back to the seat when the internal pressure is removed. The offensive gases generated by the decomposition of the body pass through the aperture, *a*, and enter into immediate contact with the chemical compound placed in the deodorizing chamber, A, and, after permeating slowly through the preparation placed thereon, escape (when the necessary pressure from the gases is evolved) through the self-acting elastic valve, C, into the outer air, destitute of the slightest disagreeable odor, and perfectly free from contagious or infectious properties.

The simplicity of this invention, as we before remarked, is one of its highest recommendations, as it can be applied to the most simple and inexpensive coffin; and after the deceased is placed in it, the lapse of months will not render the body offensive to any one. Especially at the present time is its introduction to be desired, when desolation and grief exist in almost every home in the land.

The Sanitary Commission of St. Louis, Mo. (composed of medical gentlemen) have made a voluminous report, recommending the adoption of this invention, after having carefully tested it; and at their instance, the Surgeon-general of the United States Army witnessed an experiment under his especial supervision. It fully succeeded, and for sanitary and other reasons, he cordially recommended its adoption for army purposes. The certificates of this eminent gentleman and the Sanitary Committee, also the opinion of Dr. Valentine Mott, will be found in an advertisement in another column, to which we direct the special attention of our readers.

Improved Currency-holder.

The substitution of the postal currency for the sticky stamps, as a means of giving fractional parts of a dollar in business transactions, is a desirable improvement. Riches take wings, it is said, and the proverb is literally true in handling the present "change;" it is inconvenient, not to say mortifying, to see it scattered in the air like snow-flakes when one is engaged in distributing it. To prevent any such disaster and expedite settlements of the kind in question, the currency-holder, herewith illustrated, has been specially designed. It is merely a box, A, made of tin, having partitions corresponding in number to the different denominations of the bills, these boxes have a wire, *a*, extending through them on which tin cylinders, B, are suspended. The money is retained below these by the weight of the cylinder and the boxes can be filled as full as the wire will allow the cylinder to rise. The holder is elevated a little on the backside in the engraving, to show it more fully; in its natural position the bills lay in a plane inclined downwards, so that they are prevented from being dislodged accidentally, and that they may be more easily withdrawn. The engraving explains itself clearly, and the holder is now coming into universal use, we are told, by business men and corporated bodies in the Eastern States. This holder is the invention of Mr. George K. Snow, of Boston, Mass., and was patented on Oct. 21, 1862. The article is manufactured and sold by George K. Snow & Hapgood, *Pathfinder* Office, 22 Court street, Boston, Mass., to whom orders may be addressed.



SNOW'S PATENT CURRENCY-HOLDER.

Construction of Armor Vessels.

A paper was lately read before the United Service Institution, London, by Mr. S. Barrass, on armor-plated vessels made wholly of iron. He said that a vessel of the kind he proposed should be regarded under three conditions—hydrostatically, as a body designed to float in water; mechanically, as a beam subject to great pressure; and lastly as a floating battery for purposes of defense. A ship to be constructed on his principle should have a flat bottom amidships, where the boilers and coal bunkers were, and should be constituted wholly of iron, in three sheets of iron plates riveted together in such a manner as to be protected either by an outer or an inner coat of the plating. He strongly objected to a ship built of mixed materials, differing widely from each other in chemical properties, as they never could work in harmony together. One point connected with the present construction of ships demanded consideration, and that was the destructive electrical action which took place in salt water with mixed constructions of iron and wood with fastenings of brass. As for the present system of shipbuilding, the probable result might be anticipated—the most serious and ruinous expenses would be gone to, on ships that could not be expected to last for a dozen years, while a ship constructed as he proposed, he ventured to affirm, would be an efficient ship for half a century, if not longer. Long and careful studying and active observation of armor-plated vessels since their introduction, had produced conviction to his mind that the present plan of construction would end in disappointment.

Mr. Scott Russell had seen the effect of the Armstrong guns, and he was of opinion that they could not stop a shot with anything less than good 4½-inch or 5½-inch iron plates. He wished they could, for those vessels with thin plates would be much more economical to build. Mr. Stephens, who was an American, and the first inventor of these iron-plated vessels, was still of the same opinion that thin plates were best; but there they used light charges of powder and heavy shot, and they were just the projectiles that would not penetrate. We, on the contrary, used heavy charges of powder and light shot, and they would penetrate by their velocity where the American's would not. Mr. Barrass's plan would produce the most uneasy ships that could be imagined. He had fallen into the same mistake that he (Mr. Russell) and many others had, until experience had corrected their error.

Captain Scott said he had seen the experiments at Shoeburyness, and the Armstrong gun had penetrated 4½-inch plates, while 5-inch plates resisted it successfully, thus showing that the extra half-inch was worth all the back packing.

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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VOL. VIII, NO. 9....[NEW SERIES.]....*Nineteenth Year.*

NEW YORK, SATURDAY, FEBRUARY 28, 1863.

WHAT CAN BE DONE FOR INVENTORS—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past SEVENTEEN years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are procurble through the agency of this office. We also publish a larger pamphlet containing the PATENT LAWS of the United States with a digest of facts relative to the rights of inventors and assignees. This pamphlet is important to every person who owns a patent or is about to apply for one. Sent by mail on receipt of six cents.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address

MUNN & Co.,
No. 37 Park Row, New York.

AMERICAN AND ENGLISH STEAM FIRE-ENGINES.

The development and application of steam power to work fire-engines has been long behind the application of steam to many other purposes; but the prejudices and interests which stood in its way have at last been happily removed, both in the New and Old Worlds, and the time is not far distant when hand fire-engines generally will be numbered with the relics of a past age. On this subject the London *Mechanics' Magazine* says:—"Mr. John Braithwaite, C. E., was the first to make use of this powerful class of fire-extinguishing apparatus. He brought out the steam fire-engine some twenty years ago. With our national horror of novelty it was not taken up at the time, and Mr. Braithwaite had to abandon it, after much expense and labor to himself. Not so, however, with our clever and enterprising cousins across the Atlantic, with whom hand labor is scarce, and who have no such antipathy for novelty. Accordingly, Mr. Braithwaite's steam fire-engine, though rejected in England, has been for years in successful operation in the United States of America." Our cotemporary then states that Messrs. Shand & Mason constructed one for the London Fire Brigade, which has been in use since April, 1860, and it was found so useful that several others of a like character have since been built, and are now in service. It also states that there are two steam floating fire-engines in London, which are used on the river to extinguish fires in vessels, and in the stores on the docks. A new floating fire-engine has also lately been ordered, which will be the most powerful ever built. The engines are to be 80 nominal horse-power, but will work up to 160, and they are adapted to propel the boat and work the pumps. The latter will throw eight streams, each 1½ inches in diameter, on the fire, and they can throw to a hight of 150 feet. Two such engines—one for the East river and the other for the Hudson river—would be great safeguards to the shipping of New York. In this particular feature London is in advance of us, respecting fire-engines. The *Mechanics' Magazine* is mistaken, however, in asserting that it is Mr. Braithwaite's steam fire-engine which is in use in America. In 1840 the Mechanics' Institute of New York offered a gold medal for the best plan of a steam fire-engine. Three plans were sent in, and the one of Capt. Ericsson received the award. Mr. Braithwaite's fire-engine was designed, we believe, by his former associate in business—Capt. Ericsson.

The city of Cincinnati has the credit of first employing steam fire-engines and originating a steam fire-department. From thence such engines have spread to most of our cities. A practical steam fire-engine must combine lightness and strength of parts with a rapid generation of steam. The boiler is the most important feature in such fire agents, for it must be light and get up a working pressure of steam rapidly, or the entire engine is of little worth. The American fire-engines have vertical tubular boilers, while Ericsson's first engine—the parent of Braithwaite's—had a horizontal boiler. In our opinion the success of our present steam fire-engines is chiefly due to the improved American boiler, which has been borrowed by the English engineers. Quite a variety of such engines are employed in America, but the boiler is nearly similar in all. At a recent fire in this city we counted four varieties out of six engines, made at as many different establishments. The latest built machines are improved by being made lighter and much less clumsy than those that were first introduced. The London *Engineer*, of the 23d of January, contains a brief description of a trial that took place on the 15th previous, with two steam fire-engines, called *The Torrent* and *The Deluge*, at West Ham Abbey Print-works. The latter was a new engine, having a steam cylinder of 6½ inches diameter, and stroke of 12 inches, with a double-acting pump of same stroke, but 4¾ inches diameter. It had no fly wheel and the boiler was fed by a Giffard injector. Its boiler must be inferior to many American fire-engines, for it was 12 minutes 10 seconds after the fire was lighted, before steam was up to 50 pounds and it had commenced working. We have seen an American engine get to work in one-half of this time, after the fire was kindled.

THE PRESSURE OF THE ATMOSPHERE—A VACUUM.

Among the ancient philosophers a hypothesis prevailed that "nature abhorred a vacuum." They were led to this conclusion by observing that no vacuum existed in the world. They found that when a tube was placed with one end in water and the mouth applied to it at the other end, the water would rise in the tube by what was called *suction*—a term still in use, but now better understood. From this it was concluded that nature abhorred a vacuum. This illusion was dispelled by the erection of a pump at Florence, by which it was found impossible to raise the water to the top of the pipe. Astonishment was excited by the fact, and Gallileo being then alive, he was consulted as to the cause. Upon measuring the hight of the tube it was found to be thirty-four feet, but he could not explain the phenomena. Torricelli, his illustrious pupil, unraveled the mystery. Up till that period it was supposed that the air possessed no weight. Torricelli came to the conclusion that it did possess weight, and he inferred that as a column of water had been raised by suction in a tube to a hight of thirty-three feet, he thought if this were due to the weight and pressure of the atmosphere, it could in like manner support a shorter column of a heavier fluid than water. As mercury was known to be nearly fourteen times heavier than water, he said the atmosphere should support a column of mercury about two and a half feet in hight. In order to test this hypothesis, he took a glass tube three feet in length, closed it at one end and filled it full of mercury. He then closed its open end with his finger and set it in a small basin filled with mercury. On withdrawing his finger the mercury fell six inches in the tube, leaving a column of thirty inches standing above the level of the basin. The upper six inches in the tube formed a perfect vacuum, which, in honor of the name of the inventor, has been called the "Torricellian vacuum." The cause of the suspension of the mercury in the tube was demonstrated still more clearly by carrying the apparatus to the top of a lofty tower, when the mercury fell two inches. Thus was disproved the old hypothesis "nature abhors a vacuum," and thus the barometer was discovered. No such principle as suction exists; it is the pressure of the atmosphere, not suction, that causes water to rise in the inlet tube of a pump. Pascal first proposed and used the barometer to estimate the hight of mountains, instead of by direct measurement, as had been the method formerly. This instrument is now exclusively employed for such purposes.

The velocity of gases and liquids flowing into a vacuum is in proportion to their pressure and density, and the pressure of water and air is according to the hight of the column. Thus a column of water 33 feet in hight exercises a pressure of 15 lbs. on the square inch, which is exactly the pressure exercised by a column of air extending to the hight of the atmosphere. The atmosphere increases in rarity as we ascend, because air is compressible; but water is considered incompressible, and on the top of the highest mountain it is as dense as at the level of the sea. Air flows into vacuum at the velocity of 1,340 feet per second; water, from a hight of 33 feet—the same pressure as the atmosphere—flows into a vacuum at a velocity of about 46 feet per second.

A BOARD OF ADMIRALTY.

It has occurred to us many times, in the course of our professional experience, that it would be of inestimable value to the country if the Government would appoint a board of experienced persons to examine into the merits of new naval inventions, decide whether they are fit to be adopted into the service. Such a body of men, if properly selected, would without doubt materially advance the best interests of the inventors themselves. The fact of there being such a provision made for the purpose of passing enlightened and intelligent criticism upon machines designed for national purposes would result in bringing to light many formidable weapons that are now laid aside from lack of means or energy on the part of the originator to prosecute them. It is useless to deny that our inventors have been much discouraged in their efforts to bring forward their discoveries by the very persons who should, of all others, have aided them in so doing, and it is high time that some change be made in this respect.

If a board of professional examiners should be organized by Government, it would defeat the very object for which it was authorized, to appoint men for the places who are full of old ideas and crammed with prejudices against novelties. It is of no use to say, as one remarkably astute official said: "D—— these new improvements! Can't fight without killing people, sir; keep on this way that is, improving], be nobody killed!" The language referred to was

used in reference to iron-clads. The old warrior thought that the smoke and consequently the glory of naval engagements was materially diminished by impregnable sides.

The Board of Admiralty, in prospective, should be clothed with full power to reject or accept such inventions as are submitted to them, and their decision should be final—one from which there could be no appeal. To this feature our inventors would not object, provided the admiralty was composed of men who had a recognized position in their several callings, and it would save the country an endless amount of time and expense which might as well be avoided. The character of the board ought to be such that it could not be impeached on the ground of interest or collusion with other interested parties; and, as has been remarked by a writer in the daily press, "every member of the board should be held responsible for his own opinion," as he would undoubtedly be when elected to office. Should such a scheme be carried out, we feel certain that with the right men in it and with proper management, it could not fail to satisfy the popular demand. If, however, we are to have the same old routine that has hitherto been practiced in regard to weapons and inventions for national protection, we might as well be satisfied with our present condition. The frogs petitioned Jupiter for a king, and he gave them a log; but this they despised and derided, and asked for another. He then gave them a stork who immediately devoured the frogs without ceremony. Perhaps we might have reason hereafter to apply the fable to the Board of Admiralty and regret that we had not been contented to get along without its assistance.

In these days of political corruption when party hacks fill every nook and corner of official patronage, we shrink almost with horror at the bare mention of multiplying offices to be filled probably by a set of rascals acting on the principle of the doctors mentioned in "Hudibras," who said:—

"If to cure all men is beyond our skill,
'Tis hard indeed if we can't *keep them ill*."

A NEW ILLUMINATOR—SMITH'S AIR LIGHT.

It is well known to all persons who have given any attention to the subject, that, if a more powerful light than the present ones used could be devised, equal in economy to them, its application to the arts and sciences would be highly desirable and beneficial. For railroad purposes, especially, its advantages would be manifest to all. To develope such an illuminator, Dr. George Hand Smith, of Rochester, instituted a number of experiments, and has at length been successful in producing one that, so far, seems to possess the most desirable features. His invention has been introduced upon the New York Central Railroad, and we have seen testimonials of a high character from the officials familiar with it. We saw one of them, a few nights since, on Broadway, and the light produced was of a most vivid and intense description. The inventor states that he has used it for photographic purposes, and that, by its virtues as a compound blowpipe, he has been able to deflagrate metals which fuse only at high temperatures. The inventor says:—

"This light belongs to that class of illuminators wherein a solid substance, such as a pencil of lime, is rendered incandescent, or intensely luminous, by the concentrated heat of ignited jets of combined gases. Of these lights the oxyhydrogen is the type, where, as its name imports, the gases thus employed are oxygen and hydrogen. The power of the oxyhydrogen light is well known, and repeated efforts have been made, in Europe as well as in this country, to employ it for practical purposes; but the great expense of supplying the gas, particularly the oxygen, together with the rapid deterioration of the lime, has defeated these attempts. The employment of lime for the purposes of illumination has lately attracted much attention abroad, from the extreme beauty of its light, but the difficulties just mentioned have prevented its introduction. It is here that my newly-discovered method applies, viz., the abundant supply of that greatest ingredient of artificial illumination—oxygen gas—literally without cost, by the employment of atmospheric air; carbureted hydrogen or common gas being substituted for hydrogen. Now, common air contains one part of oxygen and about three parts of nitrogen gas; hence it would require four parts of air to give the amount of oxygen required for illuminating purposes, *i.e.*, to obtain one part of oxygen four feet of air would be needed, as three feet would be nitrogen. Now, the great difficulty in using air for the purpose under discussion arises from the fact (and this fact alone has prevented its adoption) that four parts of air are combined with one of common gas, the gas is so greatly diluted as to prevent its burning readily, and what is still worse, if combustion was complete the nitrogen, not being combustible, would fly off unconsummed, and carry away the heat generated to such a degree as to render the luminosity of the cylinder of lime of no practical value. But if an amount of heat, from any source, is applied to the current of air previous to ignition, sufficient to supply the loss of heat from nitrogen, at the time of combustion, no heat is lost upon the lime, and the whole power of the oxygen is obtained as though no nitrogen was present. Also, the gas will be found to combine with a larger amount of hot air (and consequently oxygen) than with cold air. Hence, by supplying a current of pre-heated air to one of common gas ignited, an ample supply of oxygen is afforded, and all the heat generated is saved and concentrated upon the lime. This is the principal feature of my new method.

"The burner devised for railway lights is composed of four compound jets encircling a small cylinder of lime. A current of air and gas is conveyed to each jet, and, by a simple device, the stream of air is heated before it reaches the jet. The fourfold intensity of heat induces the dazzling whiteness of the lime peculiar to the oxyhydrogen light. When placed in the focus of a parabolic reflector, such as are in present use upon locomotive engines, it is increased to a ball of light 20 inches in diameter, or to the size of the mirror. The flow of air and gas is reliably and simply controlled by durable regulators and stop-cocks, within the lamp. Two gas-holders, placed under the engine, communicating with the lamp by a small pipe for each, carry twice or three times the requirements of a trip. These receive their charge at the engine-houses, before starting, from two stationary holders of larger dimensions, which are kept filled by a small pump driven by the local power employed at those places. To fill the holders on each locomotive occupies its engineer only from three to four minutes—very much less time than is required for filling and trimming an oil lamp.

"The great and remarkable feature of this discovery is, that a light of the most powerful character is produced almost entirely from air. The economy of this feature may be illustrated by stating that the Commissioners of the Central Park paid last winter, for the oxyhydrogen light, $1 60 per hour for each light; while the air light, of equal brilliancy, is produced for a trifle over *one cent* per hour!"

ABSORPTION OF GASES BY WATER AND THE LUNGS.

Set a pitcher of water in a room, and in a few hours it will have absorbed nearly all the respired and perspired gases in the room, the air of which will have become purer, but the water will be utterly filthy. The colder the water is, the greater its capacity to contain these gases.* At ordinary temperatures, it will absorb a pint of carbonic acid gas, and a large quantity of ammonia. This capacity is nearly doubled by reducing the water to the temperature of ice. Hence water kept in the room for a while is always unfit for use. For the same reason the water in a pump stock should always be pumped out in the morning, before any is used. Impure water is more injurious than impure air.

The above paragraph we quote from an exchange; it contains some truth, but more error. It asserts that a pitcher of water placed in a room will absorb nearly all the perspired and respired gases in the room in a few hours, without any reference to the size of the pitcher or the number of persons in the room; although it adds with the semblance of precision, that "it will absorb a pint of carbonic acid gas and a large quantity of ammonia." Water has a wonderful power in the absorption of gases, but not to the extent set forth in the above extract. We will give the science of the subject. At the temperature of 60° Fah. water will absorb its own bulk of carbonic acid gas, nitrous oxide, and hydrosulphuric acid, but only 1-53 per cent of its bulk of hydrogen. River and lake water contains about 2½ per cent of its bulk of air, but it is remarkable that this air contains 32 per cent of oxygen, while atmospheric air contains only 21 per cent of oxygen. As air is expelled from water by heat, the air in a warm room is much invigorated by the evaporation of water placed upon a heater or stove in it. At altitudes of 8,000 feet water does not contain one per cent of air, hence fishes cannot live in Alpine lakes, as the quantity of air in the water is not sufficient for their respiration. It is all nonsense to state that a pitcher of water placed in a room exercises the least noticeable effect in purifying the atmosphere by absorbing the gases expelled from the lungs of persons. The amount of air required for respiration per minute by a full grown man is one gallon, and two cubic feet of air per minute are rendered unfit for breathing by the carbonic acid gas expelled from his lungs. It would therefore require a pitcher containing 750 gallons of water to absorb the vitiated air of a room in which there was but one person, and the water would have to be renewed every hour!

Ammonia is neither perspired nor respired. Carbonic acid gas and the vapor of water are expelled from the lungs in the act of breathing. This is the gas which imparts the sparkle to wines and soda water. It is formed in the lungs by the oxygen of the inhaled air combining with the carbon in the blood. The phenomena of breathing involve remarkable mechanical and chemical problems. The air is not brought into direct contact with the blood in the lungs; it is spread over an extensive membraneous surface, and the carbon of the blood passes through this membrane and unites chemically with two equivalents of the oxygen, thus forming carbonic acid gas; such chemical action is slow combustion. When taken into the stomach, carbonic acid gas is rather exhilarating; it is only poisonous to the human system when inhaled by the lungs.

A CHANCE FOR THE INGENIOUS.

It appears from the report of the late attack by the iron-clad *Montauk* upon Fort McAllister, Ga., that when the steamer came within a mile and a half of the fortification, her further progress was stopped by a row of piles, firmly driven down and extending across the stream. The *Montauk* was not provided with any device for removing or cutting off the piles and so she had to remain there at anchor, and do the best she could in the way of shelling the fort. Little damage appears to have been done on either side. Now, had the *Montauk* been provided with a contrivance for blowing up or sawing off these piles, it is probable that her attack would have been attended with very different results. In addition to the capture of the fort and all its inmates, she could have captured the fine rebel steamship *Nashville*, which lay at anchor above the fort, in full view of the *Montauk* but out of reach of her guns.

The rebels rely upon piles as a means of preventing our iron-clads from navigating their rivers. We hope that some of our ingenious readers will instantly set to work and develop the mechanical apparatus necessary to render all such obstructions useless. It seems to us that at very little expense a portable machine could be produced, which, operated from on board ship, would soon cut out any desired opening through wooden piles.

International Agricultural Exhibition at Hamburg.

We have received from Mr. Robert Froëlich, agent, No. 49 Cedar street, this city, a circular containing information respecting the International Agricultural Exhibition, which is to be held in the city of Hamburg in the month of July next, commencing on the 14th and ending on the 20th. The animals and implements to be exhibited will be of the same diversified character as those which are usually displayed at our agricultural fairs. This will be the first exhibition of the kind held in Germany. The prize offered for the best steam plow is $700—second best $300.

Mr. Crittenden, of Kentucky, from the Committee on Foreign Affairs, has reported a joint resolution in Congress to facilitate a proper representation of the industrial interests of the United States at the above-named Exhibition. It appropriates $10,000 for the transportation of articles from all the States to this city (New York), thence to Hamburg and back, to be returned free of duty; and also $5,000 for the salaries of a commissioner and clerk.

DISCOVERIES AND INVENTIONS ABROAD.

The following are some of the more useful of the oreign discoveries and inventions recently patented in Europe :—

Refining Oils.—A patent has been taken out by J. A. Pols, of London, for refining different kinds of oils. For machinery oil he takes any of the crude vegetable or animal oils and mixes with it about ten per cent of the chloride of lime of the strength of 20°, and agitates the oil with this ; then adds about seven per cent. of sulphuric acid, stirs the whole and allows it to settle. After this operation it is washed and filtered, and forms a bright oil, free from mucilage, and not easily affected by cold. Rape seed and olive oil may be refined in the same manner, for burning in a common lamp.

Preparing Hides for Driving Bands.—A peculiar method of treating hides, to prepare them for bands to drive machinery, or to be used as harness traces, has been patented by H. C. Jennings, of London. The hides are first deprived of hair by the usual liming or sweating process, or by immersion in a lye of caustic soda. After being de-haired they are pared and smoothed with a shaving knife on the flesh side, so as to render them of uniform thickness. After this they are steeped for two days in a cold solution of carbonate of soda of about 3° strength ; then they are lifted, drained for a few hours, and then steeped in a saturated solution of the sulphate of iron, containing about three per cent. of sulphuric acid. When this solution of iron has penetrated into the interior of the skins, they are lifted, then soaked in a solution of the carbonate of soda for about twelve hours, then returned to the sulphate of iron solution, and thus they are alternately soaked in the two solutions until the skins become firm and the gelatine has been transformed into an insoluble substance. They are then steeped in a mixture of refined petroleum, in which has been dissolved about 15 per cent. of resin ; then they are dried in the air and afterward rubbed down with a mixture of linseed oil and turpentine. They are now cut into strips of suitable breadth for any kind of band or for harness traces, then run between pressure rollers. Before the different lengths are sewed into bands they are rubbed with a mixture of neats' foot oil and soap, to render them soft and pliable. Bands for driving machinery thus prepared, are said to be very strong and durable.

Blue Aniline Dye.—J. Ingham and W. P. Wood, of England, manufacture a blue color from any red aniline dye, by mixing the latter with caustic soda and subjecting it to a high heat in a sealed tube. The red color is gradually converted into a blue solution by this treatment. To render it fit for coloring silk, wool and cotton, the blue color thus obtained is dissolved in alcohol.

Casting and Boring Steel Barrels of Rifles.—In boring solid steel barrels, irregularities in the hardness of the metal frequently divert the tool from a straight line. To obviate this difficulty Gustave Fuhrman, of Paris, has taken out a patent for casting the ingots of solid steel barrels for fire-arms, each with a central fine core of soft metal. This core preserves a central point during the operation of rolling, and it forms a guide to the boring tool in drilling to prevent its deviation, thus enabling such barrels to be drilled with greater ease and precision.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Forming Locks on Tinned Plates.—This invention relates to a new and improved machine for the use of tinners and other workers in sheet metal, and is designed to supersede the ordinary machine for the same purpose, namely, the bending or forming of the locks at the ends of tinned or sheet-metal plates, in order to secure them together. The invention consists in having the folding bar of the machine near one or both of its ends, arranged in such a manner as to work on a concentric guide or bearing and admit of the plates to be operated upon being inserted laterally into the machine at either side, thereby avoiding considerable difficulty and embarrassment which attend the working of the ordinary machines in use. The invention also consists in using, in connection with the folding bar alluded to, two movable jaws connected with a lever and arranged in such a manner and with the folding bar, as to operate in a far more advantageous manner than usual to accomplish the desired result. Emmons Manley, of Marion, N. Y., is the inventor of the above improvement.

Projectile for Ordnance.—The object of this invention is to obtain an explosive projectile for ordnance that will break into pieces as numerous and of such a size as may be desired, say, for instance about the size of musket bullets, and to this end it consists in the construction of the whole or a portion of the body of such a projectile of one or more series of separate rings corrugated in an angular or other form, or otherwise notched to weaken them in such points as may be desired ; the several rings of a series are arranged side by side lengthwise of the projectile, and the several series, when several series are used, being arranged one within another, and their angularly corrugated or zig-zag surfaces being so arranged with respect to each other as to best provide for the breakage of the rings into numerous pieces. L. D. Gerardin, of Jersey City, N. J., is the inventor of this projectile.

Centrifugal Governor for Steam Engines.—This invention consists in the construction of the ball arms partly of tubes and partly of bars fitted to slide in the said tubes in such a manner as to elevate and shorten the arms, and in so connecting the said arms with the slide and applying a spring in combination with the said arms, that as the balls move outward by the centrifugal force developed in their revolution, the spring is caused to shorten the arms and so increase the movement of the slide produced by the change in the plane of revolution of the balls, by increasing such change, thereby rendering the governor more sensitive and increasing its action upon the regulating valve or valves. The invention is the patent of John C. Cline, of Philadelphia, Pa. An engraving of this governor is in course of preparation and will soon appear in these columns.

Dowelling Machine for the use of Coopers.—This invention relates to a new and improved machine for boring holes in barrel headings to receive the dowel pins which connect the several parts or pieces of the heads together. The invention consists in a novel manner of arranging the driving mechanism which rotates the bits and also in a novel construction of the feed table, whereby the bits may be adjusted with the greatest facility so as to bore the holes into the pieces of heading at the proper points, the machine at the same time being adapted for boring headings of different thicknesses without any special adjustment of the working parts of the former. John German, of Oriskany Falls, N. Y., is the inventor of this improvement.

Sewing Machine.—The principal object of this invention is to construct a sewing machine so as to work equally well with its wheel or pulley rotating in either direction, by which means two important advantages are obtained, namely, the thread is not broken by accidentally turning the machine the wrong way, as it is in all of the machines at present in use, and the direction of the sewing may be instantaneously reversed at any time by simply reversing the direction of the driving wheel or pulley ; and the principal part of the invention consists in the arrangement of the needle and shuttle operating and feed operating cams, or their equivalents, and of the mechanism employed in connection with them to effect the above-mentioned result. The invention also consists in an improved tension device for producing a variable tension on the needle thread. J. G. Hollowell, of Canandaigua, N. Y., is the inventor of this device.

Artificial Limbs.—The first part of this invention relates to the bucket or socket of artificial legs or arms intended to receive the stump, and it consists in the fastening of such bucket to the stump by means of atmospheric pressure, in such a manner that the straps usually employed for this purpose can be dispensed with, and at the same time a perfect fit of the bucket is attained. The invention consists further in the peculiar construction of the knee-joint, which is formed of two cylindrical rollers, one being secured to the upper end of the large bone of the leg (*tibia*) and the other to the lower end of the thigh bone (*femur*), and each provided with a projecting lip or stop, in combination with an elastic band or spring and with a double concave sector fitting between the two cylindrical rollers, and held in place by metallic clasps which also form the bearings for the axes of said rollers in such a manner that, in walking, the cylinders roll over each other instead of rubbing, as is the case with other joints, and consequently the friction is considerably diminished, and, at the same time, by the elastic band, the forward movement of the foot, while walking, is facilitated and uniform elastic pressure on the knee pan is effected. It consists further, in dividing the toe piece of the foot in two or more distinct parts, each being provided with a separate joint and adjustable spring, in such a manner that the toes can adapt themselves to the inequalities of the ground. It consists, finally, in the arrangement of curved tails or shanks projecting from the toes on the under side or sole of the foot, in combination with suitable leather straps and springs and adjusting clasp, in such a manner that the rigidity in the play of the toes can be regulated at pleasure, and that the toes are kept in the proper position to prevent interference when bringing the foot forward, and when the foot is brought down on the ground, it presents a comparatively large and a yielding base, and enables the person wearing the leg to maintain his or her balance with little labor. Dubois D. Parmelee, of New York city, is the inventor of this improvement.

Packing for Piston Rods.—This invention consists in a certain arrangement of two or more packing rings of metal or other suitable material within a gland or within the cover of a stuffing box, in such a manner that the steam or other fluid to be confined may be allowed to act upon their outer peripheries for the purpose of keeping them in close contact with the rod or stem, and that the gland will serve as a box in which they are applied to and removed from the rod. John Johnson, of Roxbury, Mass., is the inventor of this device.

Magazines and other Publications Received.

A DICTIONARY OF THE SOLUBILITIES OF CHEMICAL SUBSTANCES, by Frank H. Storer. Published by Sever & Francis, Cambridge, Mass.

This is an original work by one of our most industrious, observing and scientific young American chemists. It is to be published in one volume, formed of three parts, the first of which is now issued. It requires no word of commendation from us to set forth the value of such a work to chemists. It will supply a want long felt and acknowledged.

GRAHAM'S STANDARD PHONOGRAPHIC DICTIONARY. Published by the author, Andrew J. Graham, No. 274 Canal street, New York.

We have examined this work with much care, and have no hesitation in pronouncing it one of the most valuable contributions yet given to the phonographic science. To the student of standard phonography it will be found invaluable as a text-book; and by the professional reporter it needs only to be seen to be appreciated. The octavo volume comprises 1,003 two-column pages of words and phrases which are of most frequent occurrence in our language. Each of these words or phrases has placed after it the name of the character or characters (the position being designated by figures), by which a correct outline is produced, so that any one familiar with the standard phonography, is enabled to see at a glance how a certain word or phrase may be most readily, correctly and legibly written. The introduction to the work contains a lucid exposition of the phonographic nomenclature, a key to the pronunciation, vocalization, &c. The author in this, as well as in the works which have preceeded it, has displayed much good judgment and talent. To him is due, perhaps more than to any other, the credit of having brought the science of phonography to such a state that little, if anything, remains to be done, except it be to extend the list of sign-words and contractions. As the author very justly observes in the preface, a work of this kind was unquestionably needed, but practically impossible with requisite completeness before the construction of a definite, convenient and systematic nomenclature. Mr. Graham has devoted years of hard labor to produce such a nomenclature, and that he has succeded every candid mind, we think, must admit. The typographical part of the work is unexceptionable, and throughout, the work is gotten up in most excellent taste.

THE MORAL SAYINGS OF PUBLIUS SYRUS. Andrew J. Graham, No. 274 Canal street, New York.

Publius Syrus was a Roman slave who lived 19 centuries ago. He was celebrated among the Romans as a writer of plays, and is called by some "the Roman Shakspeare." The book in question is a collection of his oracular sayings clearly and legibly printed. They form appropriate reading for those who are fond of wisdom condensed into the smallest space.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING FEBRUARY 10, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,605.—Grinding Mill.—E. Brisson, Orleans, France :

I claim, first, The mode of bushing or securing the spindle, D, in the eye, K, of the lower stone, I, to wit, by means of the cylindrical hub, C, provided with recesses, e, in its upper end, and having wooden blocks, d, and wedges or keyes fitted therein, the latter being adjusted by the screws, g, so as to press the blocks, d, against the spindle which passes through the hub, C, as set forth.

Second, The hanging or suspending of both stones, I M, on universal joints, one stone (the runner) being connected with the spindle, D, by means of the pin, l, passing through the latter and having the turning bar, P, fitted upon it, into or through which bar the spindle passes, and the other stone fitted on the pins, a a, of the hub, C, or equivalent bearings, through the medium of the thimble, J, and swinging socket, L, these latter-named parts, with the hub, C, being applied, if desired, to the outer surface or exterior of stone, I, and the parts in the eye, K, of the stone, I, fitted in the eye, O, of the stone, M, substantially as and for the purpose set forth.

[This invention consists in hanging both the runner and the stationary stone of a pair of mill stones in such a manner that the parallelism of the two stones will always be preserved and the stones made to operate much more efficiently than hitherto, producing better work, the flour not being liable to be heated or "scratched," as it is technically termed, and the stones also prevented from being worn unevenly.]

37,606.—Lamp Burner.—Harvey Brown, New York City :

I claim, first, The arrangement and construction of the spur wheel, A', in combination and connection by means of the cog wheels, D D, or their equivalent, with the spur wheel, A, for the purpose of moving the wick, substantially as described.

Second, I claim the band, B, in combination with the perforated burner, B', (substantially in the manner and for the purpose set forth.

Third, I claim the springs, C C, constructed, arranged and operated substantially in the manner and for the purposes set forth.

37,607.—Cartridge Box.—Francis Bush, Boston, Mass. :

I claim providing the outer metallic box or case with one or more partitions in such manner that they shall not interfere with the free working of the inner sliding box, for the purpose specified.

37,608.—Steam Boiler Furnace.—Horatio Clarke, Dedham, Mass. :

I claim the grate constructed in a curved form, and arranged concentrically, or about so, with the curved fire surface of the boiler, substantially as described.

I claim a curved grate in combination with a curved bridge, their upper surfaces being arranged substantially as described, with the fire surface of the boiler.

And I also claim the curved grate and the curved bridge, arranged with their upper surfaces concentric with the fire surface of the boiler, in combination with jambs arranged in the inclined manner with respect to them, substantially as described.

37,609.—Centrifugal Governor.—J. C. Cline, Philadelphia, Pa. :

I claim the combination of the ball arms composed of tubes, C C, and bars, D D, or their equivalents fitted together, as described, the spring, G, the rods, E E, and slide, F, the whole arranged to operate substantially as and for the purpose herein specified.

37,610.—Fire-extinguisher.—Alanson Crane, Fortress Monroe, Va. :

I claim the arrangement of the plug, E, to extend through the exterior wall of the building, in combination with the locking cover or plate, g, and with the arrangement to diffuse water through the building, as herein shown and described.

[The object of this invention is to get up a simple, cheap and reliable device for extinguishing fires in buildings, arranged so that the same can either be operated from the exterior or from the interior of the building, and particularly so that the magistrate or fire department have charge of the connections of said device outside the building.]

37,611.—Street-sweeping Machine.—John Critcherson, Boston, Mass. :

I claim attaching the fagots or broom material obliquely to the axis, when the same is accomplished by means of and in combination with the depressions running obliquely across the arms, E, and the concave caps, b, secured by screws, which confine the said fagots or broom material, as and for the purpose herein described.

37,612.—Car Coupling.—George Collyer, Philadelphia, Pa. :

I claim, first, The combination of the tumbler, C, springs, D, and grooves, a, substantially as described, whereby operators are enabled to uncouple the cars without moving the train backward or forward, no matter how closely the tumbler and the detent of the coupling bar may be pressed together.

Second, The employment of coupling bars such as shown in Fig. 9, having expansions, b, near the ends of the bars, which expansions, of themselves, uncouple the cars, in case the latter get off the track.

Third, The employment of coupling bars, such as shown in Fig. 10, having expansions, b, near the ends of the bars, with less lateral breadth than the detent, so that although one or more cars of the train may get off the track, the cars shall not be thereby uncoupled.

37,713.—Mode of Obstructing Rivers.—Aaron B. Cooley, Philadelphia, Pa. :

I claim obstructing rivers, harbors, inlets, &c., by a series of angular frames or blocks, constructed, chained to each other and anchored, substantially as set forth.

37,614.—Clarifying Saccharine Juices.—E. T. and E. O. De Gemini, Paris, France :

We claim the method of clarifying saccharine juices herein shown and described, which consists in subjecting them to the simultaneous action of molecular agitation, under steam, animal charcoal and fuller's earth, substantially in the manner set forth.

We also claim the employment of the apparatus herein shown and described, for the purpose set forth.]

[This invention consists in the treatment of saccharine juices with fuller's earth or clay and powdered bone-black, by introducing the said substances to juices and subjecting them to agitation, produced either by means of stirrers or mechanical agitation, or by the introduction of jets of steam, or by both of these means combined.]

37,615.—Grain-conveyer.—Oren C. Dodge, New York City :

I claim, first, Delivering the grain at any desired point along the line of a traveling belt, by bending said belt substantially as specified, for the introduction of a hopper or chute.

Second, I claim a traveling belt for conveying grain, provided with vertical or nearly vertical edges, forming a trough, substantially as set forth.

Third, I claim the elastic edges, 3, 3, of the belt, f, sustained by the metallic strips, 4, 4, substantially as specified.

37,616.—Grinding Edge Tools.—G. C. Eaton, Lockport, N. Y. :

I claim the adjusting slot, B B', in the part, A, the hinged arm, E, levers, G and I, connecting rod, J, stay, L, seat, K, and slide, N, arranged and operated as and for the purpose set forth.

37,617.—Sewing Machine.—G. L. Dulaney, Mount Jackson, Va. :

I claim, first, The vertically-acting needle arm, composed of one piece of metal, as indicated at w x y z, and Figs. 1 and 2, which performs the several different offices or mechanical functions, as herein set forth and described.

Second, I claim the special construction of the intermittent acting shuttle, carrier device, i2 k2 p3, r3, Fig. 4, together with the gravitating self-acting shuttle adjusting device, s2 i2 u2, Fig. 4, as shown and described.

Third, I claim the gravitating self-adjusting feed device, o3 o3, p3, q4, Fig. 3, constructed and operated in the manner described.

Fourth, I claim the self-acting gravitating pad, v2 v3 w2 w3, as constructed and combined with the self-acting gravitating feed device, o3 o3 p3 q4, the lever device, x2 v2, and the curved bar or tension device, y2 y2, with the small dependent flexible, fork-like device, z2, Figs. 1, 2, 3, substantially as set forth, shown and described.

Fifth, I claim constructing the shuttle, o2 o2, with the bottom slot or depression, o4, Fig. 4, and the combination therewith of the gravitating, self-acting shuttle-adjusting device, s2, i2, w2, Fig. 4, substantially as set forth, shown and described.

Sixth, I claim the vibrating lever, or slack-threadadjuster, f2 f f2 g2, Fig. 1, as constructed, operated and combined with the needle bar or arm, w x y z, and Figs. 1 and 2, substantially as set forth and described.

Seventh, I claim the curved bar or tension device, y2 y2 z2, Figs. 1, 2 and 3, singly or in combination with the vibrating lever or slack take-up device, f2 f2 g3 h2, so as to produce the desired effect, in the manner as set forth, shown and described.

Eighth, I claim the flexible, rotating, radial division device, a3 b3 c3 d3, Figs. 1 and 2, as constructed, set forth and described.

37,618.—Moth Trap.—John Frew, Meadville, Pa. :

I claim a bee-moth trap consisting of an external case, A, cover, B, porch, C, inner removable close box, D, provided with comb frame, H, the whole being constructed, combined and arranged in the manner and for the purpose herein specified.

[The subject of this invention is a suitably-constructed box which being supplied with old or inferior comb and placed near the inhabited hives, will be used in preference to the latter, by the moth, for depositing its eggs, and will thus enable the apiarist to destroy the larva without injury to the bees.]

37,619.—Doweling Machine for the use of Coopers.—John German, Oriskany Falls, N. Y. :

I claim, first, The three grooved pulleys, C F F, having the belt, G, passing around them, in combination with the slides, D D, having horizontal tubes or bearings, n, at their upper ends, in which the arbors, E, of the bits are secured, the whole being arranged and applied to the frame, B, as and for the purpose herein set forth.

Second, The feed table, H, provided with the cleats, t t1' 1', and bars, u u, having inclined upper surfaces, when said feed table is used in combination with the pulleys, C F F, belt, G, slides, D D, and bit arbors, E, as and for the purpose specified.

37,620.—Construction of Ships-of-war and other Batteries for Defense against Projectiles.—J. S. Gibbons, New York City :

I claim the use of wedge-shaped timbers in connection with iron plates, for the purpose of resisting projectiles, substantially as specified; and in combination therewith I claim to arranging the plates in such a manner as they cross those of another, substantially in the manner and for the purposes set forth.

37,621.—Fishing Lantern.—Joseph Goodrich, Muscoda, Wis. :

I claim the arrangement of the adjustable reflector, A, and the shaft, K, when used in connection with the box or frame of a lantern, and constructed and operating substantially as and for the purpose specified and delineated.

Second, I claim the index spring, T T, when used for the purpose of adjusting the reflector, A, substantially as set forth.

37,622.—Beehive.—J. H. Graves, Rochester, N. Y. :

I claim the combination of the removable perforated bottom, B, covering the entire space of the hive, with the auxiliary bottom, D, separately removable and adjustable to, or from, said bottom B, arranged and operating substantially as and for the purpose herein set forth.

I also claim the combination of the cut-off slide, H, skeleton frame, G, provided with the center piece, r, having the passages, h h, and open-bottomed sections, L L, arranged substantially as herein set forth.

I also claim the perforated alighting platform, C, in combination with the perforated bottom, B, substantially in the manner and for the purpose set forth.

37,623.—Washing Machine.—Jacob Hilborn (assignor to Harrison Haight), San Francisco, Cal. :

I claim making the stationary corrugated concave or washboard of a washing machine adjustable, substantially in the manner herein described, so as to adapt the machine to operate on a large or small quantity of clothes.

I also claim, in combination of the stationary washboard, B, the vertical reciprocating side washboards, E, and pendulum dashers, D, substantially in the manner and for the purposes herein described.

I also claim the combination of the stationary washboard, B, the vertical reciprocating side washboards, E, and pendulum dashers, D, substantially in the manner and for the purpose set forth.

37,624.—Sewing Machine.—J. G. Hollowell, Canandaigua, N. Y. :

I claim, first, So constructing the needle cam, I', and shuttle cam, L', and so combining them with each other and with the rockshaft for operating the needle and shuttle, that they will operate in proper relation to each other to produce the sewing, in which ever direction the cam shaft, E, or driving wheel or pulley rotates, substantially as herein specified.

Second, The feed cam, J, and presser cam, K, combined with each other and with the presser, H, to operate upon the latter and produce the feed movement in one direction or the other, according to the direction of the revolution of the main shaft, driving wheel or driving pulley, substantially as herein specified.

37,625.—Shutter Fastening.—Ambrose Hyde, Lima, N. Y. :

I claim the double-acting detent, K, in combination with the catch, E, and base, I, when so arranged as to either lock the said catch in a rigid position to hold the shutter in place, or to retain it disengaged while the shutter is removed, and operating substantially as herein specified.

37,626.—Plow.—Robert Jones, Waynesburg, Ohio :

First, I claim the particular combination of the curved inner end, c, of the beam, A, the curved shoulder, b, of the shank, B, the bolts d d', the longitudinal slots, e e, and the transverse-slot, f, when the said parts are constructed and arranged in the manner and for the purposes herein specified.

Second, I also claim the particular construction of the flange, g, with the arm, h, and ears, i, and i', permanently attached to a standard, B, having a curved shoulder, b, when used in the described combination with the landside, C, mold-board, D, and share, E; all arranged and connected in the manner and for the purposes set forth.

[This invention relates to a new and improved plow of that class which are provided with mold-boards for turning a furrow slice. The invention consists in having the mold-board and share in the form of a section of a screw-thread, whereby several advantages are obtained over the ordinary forms hitherto used. The invention also consists in a novel and improved manner of attaching certain parts of the plow together; to-wit, the mold-board to the shank, and the beam to the shank, whereby the mold-board may be readily detached when necessary, and either a cast-iron or steel mold-board used on one and the same plow, and the beam rendered capable of being adjusted so that its front end may be more or less elevated in a vertical plane, and also capable of being adjusted laterally or in a horizontal plane for the purpose of regulating the direction of the draught and adapting the plow to one, two, or three horses as may be desired.]

37,627.—Lubricator.—Arthur J. Judge, Baltimore, Md. :

I claim, first, The construction of a chamber or reservoir to hold the oil with an opening in the lower part, so small that atmospheric pressure prevents its escape, until expanded by the increased temperature of the journal.

Second, The combination of the three parts, viz: the reservoir or cup, the tube, and the socket in the manner and for the purposes herein specified.

37,628.—Trip Hammer.—Lyman Kingsley, Cambridgeport, Mass. :

I claim the anvil-block, Q, arranged substantially as shown on a plate, R, to admit of the adjustment of the anvil, P, as described.

[For an illustration and description of this invention, see page 376, Vol. VII. (new series) of the SCIENTIFIC AMERICAN.]

37,629.—Forming Locks in Tin-plate.—Emmons Manley, Marion, N. Y. :

First, Providing the folding bar, F, with a semi-circular hub, d, grooved to receive a semi-circular bearing, f, and all arranged substantially as shown to admit of an open space at one end of the bar, F, to allow the plate to be adjusted laterally between it and the jaw, D, as herein set forth.

Second, The movable or adjustable jaws, C D, arranged in connection with the lever, E, as shown, to operate as and for the purpose specified.

Third, The combination of the folding bar, F, jaws, C D, and lever, E, all arranged for joint operation as and for the purpose herein set forth.

37,630.—Harvester.—James S. Marsh, Lewisburgh, Pa. :

I claim, first, The linking devices described or their equivalents applied to the arms of the raking apparatus substantially as described.

Second, The adaptation of a raking and reeling apparatus combined, which revolves entirely around a vertical centre, for application to the *inner side* of the draft frame of a harvester at a point *below* the *top* of the drive wheel substantially as and for the purpose set forth.

Third, The use of the inner bearing of the drive wheel as the support of the centre on which the combined rake and reel revolves substantially as described.

Fourth, The construction of the shaft or centre, P, of the rake and reel, and the inner segment of the drive wheel in one piece, in the manner described.

Fifth, The combination of the cam, R, hinged rake and reel bars and *adjustable* links, so as to keep the rake and reel bars firmly in control with the grain in the field and on the platform substantially as set forth.

Sixth, The arrangement of the sliding and turning spring pin, p, incline, p2, loose bevel pinion, Q, and the raking and reeling apparatus, substantially as described.

Seventh, The adjustable grain guard, K, constructed substantially as described, and applied to the inner front corner of the draft frame, for the purpose set forth.

37,631.—Harvester.—James S. Marsh, E. & C. C. Sharkley & Peter Beaver, Lewisburgh, Pa. :

I claim, first, The joint of the piman and sickle constructed as described, in combination with the guide, 10, or its equivalent for the purpose set forth.

Second, The combination of the grain guide or guard, K, and the standards of the reel and the reel, substantially in the manner and for the purpose described.

Third, The combination of the seat base, C2, arranged over the drive wheel, with the inner grain guard or guide, K, whereby the raker can conveniently reach and rake off the grain at the front inner corner of the platform, as set forth.

Fourth, The arrangement and combination of the hollow bevel wheel, v, internally toothed ratchet, x, and spring, w, with the pinion shaft, V, and lever, F; the whole constructed as described and for the purpose set forth.

Fifth, The combination of the adjustable platform, L M, bolt, t, adjusting aperture, t', and guide slot, s, and the adjustable back beam, Q, arranged on springs, substantially as and for the purpose set forth.

Sixth, The springs, P P, or their equivalents, applied substantially as described and for the purposes herein set forth.

37,632.—Apparatus for Drying Grain, &c.—Sylvester Marsh, Chicago, Ill. :

I claim the method herein described of drying grain, malt, hops, and other similar substances, by the employment in combination with an artificial blast of air over an anthracite coal or coke fire, as set forth, of upright drying chambers composed of perforated plate or its equivalent and when arranged for operation substantially in the manner and for the purposes hereinbefore specified.

37,633.—Defensive Armor for Ships and other Batteries.—Richard Montgomery, New York City :

I claim, first, The imbricated plates, E, and corrugated iron, D, in combination with the columns or cylinders of vulcanized rubber, B, substantially as described.

Second, Fastening together the imbricated plate, E, and corrugated iron, D, by means of the rod, F, as set forth passing through the corrugations of each plate.

Third, The combination of the imbricated plates, E, with the corrugated iron, D, constructed and fastened substantially as set forth.

37,634.—Cog Wheel.—F. A. Morley, Sodus Point, N. Y. :

I claim the insulating of the periphery or parts containing the cogs by means of a stratum of a non-conductor of sound placed between said periphery and the central parts of the cog wheel; substantially in the manner and for the purpose set forth.

37,635.—Ship's Water Closet.—Peter W. Neefus, New York City :

I claim combining with the shafts, journals, and valves of ship's water-closets, substantially as described, stuffing-boxes and faced valves, so as to make them air and water-tight as herein set forth.

37,636.—Attaching Shafts or Poles to Carriages.—James Northrup, Zachariah Loomis & Giles W. Clark, Homer, N. Y. ;

We claim the arrangement and combination of the double and single clip bars, c and d d, with the corresponding depressions in each and when the single bar is made whole and connected with the double clip and with the T-headed thill or pole-iron fitting and working in said depression as and for the purpose above described.

37,637.—Artificial Leg.—Dubois D. Parmelee, New York City :

I claim, first, Fastening the bucket, A, of an artificial limb to the stump, by means of atmospheric pressure, substantially in the manner specified.

Second, The knee joint, C, constructed of two cylinders, d e, clasps, f, double concave sector, g, and elastic band, h, all arranged and operating substantially in the manner and, for the purpose herein shown and described.

Third, Dividing the toe-piece, G, in two or more distinct parts, substantially as and for the purpose set forth.

Fourth, The arrangement of the stems or tails, m*, projecting from the under side of the toe-pieces, m m' m'', in combination with the bands, n, of leather or other suitable material, and with the elastic bands, o, adjustable by a metal clasp, p, or its equivalent, all constructed and operating substantially in the manner and for the purpose described.

37,638.—Pump.—A. N. Parkhurst, Peoria, Ill. :

I claim a pump constructed of wood and baked clay having a cast-metal flange, D, attached to it as shown, and the part, E, which is formed of the baked clay attached to the wooden part, A, and to the upper section, I, of the piping by the bolts, i n, and the different sections of the piping secured together by means of the clamps, G, as herein set forth.

[This invention relates to an improved pump of that class in which the piping is composed of wood and the cylinder of baked clay. The object of the invention is to obtain a more durable pump of the kind specified, than any hitherto used, and without any more expense in the construction or manufacture of the same.]

37,639.—Composition for Slate Surface, Blackboards, &c.—Isaac Newton Peirce, Darby, Pa. :

I claim the combination of the ingredients and proportions, substantially as set forth, constituting the composition and its application in the manner and for the purpose specified.

37,640.—Making Horse-shoe and other Nails.—Benjamin W. Peirce, New Bedford, Mass. :

I claim the combination of the rotary cam, D, its sliding shaft, B

and treadle lever, C, with a series of hammers or dies, G G' H H', a nail-discharging mechanism, and a mechanism for severing or cutting the nail from its rod, the whole being substantially as herein before described.

And in combination therewith, I claim the gage, L, arranged and operating substantially as specified.

I also claim the combination of each pair of the dies with the other pair thereof, by means of the levers, K K, constructed and arranged as described and the spring, I, applied to the dies in manner and so as to cause the dies of either pair of them to recede from one another while those of the other pair may be in the act of approaching one another.

37,641.—Device for Closing Mail Bags.—George M. Rhoades, East Hamilton, N. Y.:

I claim the mode substantially as described of constructing a flexible fastening to a mail bag and for the purposes set forth.

37,642.—Bridge.—Isaiah Rogers, Washington, D. C.:

I claim, first, The combination of the hollow flanged tubes, A a, and connecting plates, B, attached together by screw bolts, C, or other suitable means for the formation of arches, in manner substantially as herein shown and described.

Second, In combination with a bridge constructed substantially as above described, I claim the inverted arch, L, employed in the manner explained to form an abutment between two adjacent arches.

[The subject of this invention is a bridge composed of a peculiar combination of tubes and plates so disposed and connected as to impart great strength and rigidity, reduce the weight and cost of the structure and render it much more easy of erection.]

37,643.—Pawl for Hay Presses.—Lorenzo D. Rundell, South Westerlo, N. Y.:

I claim the compound pawl formed by the lever, g, and body part, d, jointed together at h, and acting in the manner and for the purposes specified.

37,644.—Valve for Steam Engines.—Peter Shearer, Reading, Pa.:

I claim the slide valve, E, open at the top with the valves, n n', or their equivalent, in combination with the cover, F, applied to each other and operating substantially as herein set forth.

37,645.—Tompion for Fire-arms.—R. G. Shurtleff, Springfield, Mass.:

I claim the tompion, A, with its slits, D, and cylindrical interior, E, having lateral openings, e, in combination with the valve, I, and spring, K.

37,646.—Door Bolt.—H. S. Smith, Brooklyn, N. Y.:

I claim the notch, c, in the bolt, B, in combination with the spring, E, fitted on the knob-spindle or rod, C, the above parts being used in connection with the plate, a' a'' A, and all arranged to operate as and for the purpose set forth.

[This invention consists in providing the bolt with a shoulder near its back end, and having a spring applied to the spindle of the knob of the bolt in such a manner that when the bolt is shoved forward to its fullest extent, the spring will force the shoulder of the bolt backward beyond the edge of the hole or bearing in which the shouldered end of the bolt works, and thereby cause the bolt to be detained in a forward position, forming a lock or fastening for the bolt; the bolt being disengaged or freed from the bearing aforesaid, by drawing outward the knob previous to shoving it back.]

37,647.—Preserve Jar.—Charles F. Spencer, Rochester, N. Y.:

I claim the combined arrangement and construction of the double-flanged cover, B, packing ring, b, and jar-neck seat, a, one flange, f, of the cover compressing and tightening the packing ring, and the other flange, g, nearly filling and closing the circle within the seat, substantially as and for the purposes herein specified.

37,648.—Stencil Plate.—Samuel C. Sumner, Boston, Mass.:

I claim the holder, A, with its holes, C, slits, d, and bars, c, in combination with the letter plates, g, for the purpose described.

37,649.—Car Coupling.—Nathaniel A. Tucker, Burlington, Vt.:

I claim confining a coupling link in a recess located below two matching curved surfaces one of which is stationary, and the other movable, substantially as and for the purposes described.

37,650.—Apparatus for obtaining Profiles of Submarine Beds.—C. Van Horn, Springfield, Mass.:

I claim the employment or use of a tracing rod, G, fitted within a tube, E, or an equivalent guide, and arranged with a sliding frame, B, slide, D, tracing board, C, and a framing, A, substantially as shown, so that a series of profiles may be obtained of the surface of the bed, F, of a river or stream for the purpose of constructing a platform of a configuration corresponding to the bed to rest on the same and receive or support the caissons or foundations of piers, bridges, &c.

[The object of this invention is to obtain an apparatus or device by which a correct measurement or draughts may be obtained of the prominences and depressions of rocky or other hard sub-marine beds into which piles cannot be driven for the construction of piers, bridges, &c., and by which measurement on draughts a platform may be constructed so as to conform or fit snugly to the bed to support the caissons of piers, bridges, &c., &c.]

37,651.—Connecting Shafts or Thills to Sleighs.—Jacob C. Walter, Leonardsville, N. Y.:

In combination with the mechanism or its equivalent for changing the relative position of the shafts or thills, laterally; I claim the devices or their equivalents for changing or setting the thills forward or back substantially as described.

37,652.—Rock Drill.—J. B. Wayne and Wm. Evered, Detroit, Mich.:

We claim the manner of tripping the stem by means of the notched or double cams, C, thereby allowing the lever or pincher to drop, while the fulcrum-sleeve is supported and gradually allowed to descend on the cam, substantially as set forth.

37,653.—Spring for Carriages.—William Wharton, Birmingham, England:

I claim a combination of spring plates secured together or embedded with each other by the peculiar form or forms of the edges thereof, such plates not being dependent on slots and pins or studs to secure them in position laterally, essentially as hereinbefore described.

37,654.—Track and Switch for Street Railways.—William Wharton, Jr., Philadelphia, Pa.:

I claim the combination and arrangement, substantially as described, of the tracks, A A', B B', switch, x, tracks, E E' and F F', for the purpose specified.

37,655.—Suspended.

37,656.—Mowing Machine.—John D. Wilber, Poughkeepsie, N. Y.:

I claim, first, The main frame, C, constructed and fitted on the axle, A, as shown, in combination with the semi-circular bar, G, also fitted on the axle, A, and having the suspension chains, s s, attached to it at some distance on each side of the draft pole, F, so as to bring the said chains as nearly vertical as possible, all as herein set forth.

Second, The combination of the draft pole, F, attached centrally to the main frame; the cutting apparatus, D E, placed centrally in front of and driven by both the wheels, B B, and a double-tree, K, of such length and so placed as to separate the single-trees, S S, to a distance greater than the length of the cutting apparatus, all as herein shown and described, and for the purpose set forth.

[The object of this invention is to obtain a mowing machine in which all side draught will be avoided, and one which will leave the cut grass in a loose, light state, be of easy draught, and capable of cutting directly back and forth, so as to avoid the trouble and inconvenience of cutting around a piece of grass.]

37,657.—Grinding Die for Nail Machines.—G. B. Wiggin and J. W. Hoard, Providence, R. I.:

I claim the combination and arrangement of the two grinding wheels, A and B, with the movable carriage, E, substantially as described, for the purposes specified.

37,658.—Water Meter.—Henry Burt (assignor to himself, C. S. Titsworth and T. W. Loweree), Newark, N. J.:

I claim, first, Effecting the movement of the valve by means of two pieces with V-shaped ends and a spring, combined with the piston, to operate substantially as herein described.

Second, Combining the valve with the lever, G, or its equivalent, on which one of the V-shaped ends is formed, or to which it is attached, and which is subject to the direct action of the piston, by means of a lever, E, between which and the said lever, G, or its equivalent, lost motion is provided in order to effect the whole movement of the valve very quickly, substantially as herein described.

[This invention consists in a certain novel system of valve-operating mechanism, whereby a slide valve is moved very quickly to change the openings of the ports after the stroke of the piston, in either direction, has terminated.]

37,659.—Mechanical Movement for Lamps.—F. B. De Keravenan (assignor to J. H. Bailey and G. A. Jones), New York City:

I claim the general arrangement and combination of the mechanism, herein described, and its use and application for the purposes set forth.

37,660.—Suspended.

37,661.—Explosive Projectile for Ordnance.—L. D. Gerardin (assignor to himself and William Howeth), Jersey City, N. J.:

I claim having the outer wall of the shell composed of a series of rings placed one upon the other, and clamped together between the head and base plates, substantially as herein shown and described.

37,662.—Corn-sheller.—George Goewey (assignor to himself and William Bailey), Philadelphia, Pa.:

I claim the employment of two rollers, B B, both revolving in one direction and having two or more rows of teeth arranged spirally, for the purpose of revolving the ears of corn, said rollers being used in combination with a concave, E, having teeth thereon arranged spirally, the teeth on the concave and the teeth on the rollers operating conjointly to shell the corn from the cob, and pass the latter out at the tail of the machine.

37,663.—Packing for Piston and Other Rods.—John Johnson, Roxbury, Mass., assignor to himself and H. D. Ward, Cambridge, Mass.:

I claim the arrangement of the packing rings within the gland or stuffing-box cover, substantially as herein described, whereby the gland or cover is made to constitute a box or case to contain the said rings, and in which they can be applied and removed, and provision is made for the admission of the steam or other fluid that is to be confined to act upon the outer peripheries of the rings, substantially as and for the purpose herein specified.

37,664.—Butter-worker.—Marvin Sweet, Sidney, N. Y.:

I claim, first, The combination of the slowly-moving trough, A, with the revolving "ladle," N, formed of a smooth-piece of wood or other suitable material, without protuberances, when the said parts are constructed and arranged to operate together in the manner and for the purposes herein specified.

Second, The combination of the screw wheel, S, double cog-wheel S, and rack, 7, employed to communicate motion from the revolving "ladle," N, to the sliding trough, s, of a butter-working machine, as set forth.

37,665.—Device for Preventing Door Keys from being turned.—Amos Westcott, Syracuse, N. Y.:

I claim the combination with the curved, elastic, slotted, sliding plate, of the handle, k, pin, h, and hole, h', employed in the manner described, to secure the said sliding plate in the position for locking the key, but admit of its ready movement from within.

[This simple device is applied to the inner side of a door to prevent the possibility of turning the key from the outside by means of any instrument inserted into the keyhole.]

37,666.—Washing and Wringing Machine.—G. L. Witsel (assignor to himself and Clement Cresson), Philadelphia, Pa.:

Firstly, I claim the vibrating dasher, D, composed of the perforated boards, d and', and angular piece or partition, e, or its equivalent, when constructed, combined with and operating within a reservoir, substantially as and for the purpose described.

Secondly, The arms, H H, connected together by the cross-bar, I, arranged on and hung to the reservoir and connected to the sliding boxes, i i, of the roller, G, substantially as and for the purpose herein set forth.

37,667.—Balloon.—T. L. Shaw, Omaha City, N. T.:

I claim a balloon constructed, arranged and operated substantially in the manner described.

RE-ISSUES.

1,398.—Concentrating and Preserving Milk.—Gail Borden, Jr., Amenia, N. Y. Patented Aug. 19, 1856. Reissued May 13, 1862:

I claim, first, The within-described process, or method of operation, for concentrating and preserving milk, by means of coagulating and re-arranging the albuminous particles, in combination with the evaporation of the fluid, *in vacuo*, substantially as set forth.

Second, The preparatory coagulating and re-arranging of the albumen, when this is done as a part of the operation of making concentrated or condensed milk.

1,399.—Elastic Door-guard.—W. N. Clark, Chester, Conn. Patented Nov. 17, 1857:

I claim the above-described india-rubber or elastic gum guard, when held in place by the escutcheon, or its equivalent, as herein described, for the purpose of protecting wall, doors, and furniture, substantially as set forth.

1,400.—Machine for Shaping Irregular Surfaces in Wood.—Warren Hale, Allen Goodman, Lorenzo Hale and J. W. Goodman, of North Dana, Mass., assignees of said Warren Hale and Allen Goodman. Patented July 22, 1845, and extended:

We claim the combination of the carriage, the pattern or patterns, the tracing roller or rollers, the rotating cutting or planing cylinder, and the means for turning or holding the block of wood to be fashioned, as described, or the equivalents of them, or either of them; the said combination being so organized, substantially as described, that by its mode of operation the block of wood to be fashioned can be turned to present in succession each of its faces to the action of the cutter or planing cylinder, whose axis is at right angles, or nearly so, with the axis of the block of wood, so as to cut the wood longitudinally, while by a longitudinal movement the block of wood is gradually cut or planed from one end to the other on each face in succession, and by another movement at right angles thereto, or nearly so, the cutting action is caused to follow the irregular lines of the pattern, thereby producing a polygon of any desired number of sides of any desired configuration longitudinally and with all its sides of similar form.

[This invention pertains to that class of machinery which has for its object the reducing of plain or rough blocks of wood to any desired irregular form, but differs, it is believed, advantageously, both in its operation and results, from those which have heretofore been contrived.]

1,401.—Refining Iron by means of Blasts of Air.—Christian Shunk, Canton, Ohio. Patented May 17, 1859:

I claim, first, Blowing atmospheric air into and through a mass of molten crude iron from the ore, or from the remelted pig iron, to commingle the gases of the air with the particles of the fluid iron and its carbon, for the purpose of decarbonizing and converting the same into refined iron or steel, and malleable semi-steel without the use of fuel to keep up combustion, such conversion being effected by the gaseous matter of the atmosphere.

Second, Imparting a rotary or spiral motion to the molten iron, by or during the introduction of the air-blast, substantially as set forth.

Third, I claim the application of the flux or solvent in the manner and for the purpose herein described during the atmospheric refining process.

1,402.—Refining Iron.—Christian Shunk, Canton, Ohio. Patented July 12, 1859:

I claim a separate or auxiliary refining pot or crucible, employed to receive molten iron from a smelting or re-melting furnace, and decarbonize the same by the application of an air blast in any manner, substantially as herein described, for the production of steel or refined iron.

1,403.—Cupola and other Furnaces.—Addison Smith and J. M. Sayre, New York City, assignees of P. W. Mackenzie, of said New York City. Patented Aug. 25, 1857:

I claim, first, A cupola of elongated form, in combination with curved sides, substantially as described and for the purposes set forth.

Second, The arrangement of a continuous air chamber, in combination with a cupola and opening for the introduction of a continuous sheet of air to the fuel, substantially as described and for the purposes set forth.

Third, In combination with a cupola provided with a continuous air chamber, substantially as described, enlarging that part below the tweer, whereby the capacity of the cupola is increased, and perfect circulation of air to the full obtained, substantially as described and specified.

1,404.—Door Spring.—A. J. and K. E. Storms, Nyack, N. Y., assignees of E. P. Torrey and W. B. Tilton, of New York City. Patented Sept. 8, 1857:

We claim, first, Placing the notched wheel, D, between the jaws, C, of the bracket, A, substantially as and for the purpose shown and described.

Second, Extending the square end of the torsional rod, F, clear through the jaws of the bracket, A, as and for the purpose specified.

Third, The arrangement of the pivoted stop-plate, E, in combination with the notches, a, in the jaws of the bracket, and with the notched wheel, D, all constructed and operating substantially in the manner and for the purpose set forth.

1,405.—Water Wheel.—John Temple, W. M. Mills and A. L. Stout (assignees of said John Temple), Middletown Ohio.—Patented Feb. 8, 1859:

I claim the construction and use of the scroll sluice-gate, B C, applied to operate with a water wheel, in the manner substantially as described.

I also claim, in combination with the hinged sluice-gate, B C, the guard, A, as and for the purpose described.

I also claim the levers, K, and ring, J, centrally arranged above the sluice chest, for simultaneously operating a series of gates in combination with the gates, and actuated by mechanism substantially as described.

1,406.—Process of Manufacturing Water-proof Cement Pipes. Thurlow Weed, Albany, N. Y., and P. S. Shelton, Boston, Mass., assignees of A. F. Jaloureau, Paris, France. Patented May 24, 1859. Ante-dated Dec. 30, 1857:

I claim the process of forming pipes or tubes of rolls of paper, or other tissue, and bituminous mastic by drawing or passing the paper, or other tissue, through the liquid mastic, and rolling it up to the required thickness on a mandrel to cause the several windings and the interposed mastic to unite, substantially as described.

And what is finally claimed is the forming of such pipes or tubes on a paper sleeve, or cylindrical tube fitted to the outer surface of the mandrel, substantially as described, by means of which the pipes or tubes when made can be readily slipped off from the mandrel, as set forth.

1,407.—Water and Air-proof Pipes from Bituminous Cement.—Thurlow Weed, Albany, N. Y., and P. S. Shelton, Boston, Mass., assignees of A. F. Jaloureau, Paris, France. Patented May 24, 1859. Ante-dated Dec. 30, 1857:

I claim the new manufacture of pipes or tubes composed of several thicknesses of paper, or other tissue, rolled up and the several thicknesses or windings united by interposed bituminous mastic, substantially as described.

1,408.—Process of Manufacturing Water-proof Cement Pipes.—Thurlow Weed, Albany, N. Y., and P. S. Shelton, Boston, Mass., assignees of A. F. Jaloureau, Paris, France. Patented May 24, 1859. Ante-dated Dec. 30, 1857:

I claim, first, The mandrel on which the pipe is formed by winding, in combination with the kettle, or other vessel containing the liquid mastic or cement, and the cylinder on which the mandrel rolls, and which carries the paper, or other tissue, through the liquid mastic or cement and up to the mandrel, substantially as and for the purpose specified.

Second, The rotating mandrel and cylinder on which it rolls, in combination with the movable sleeve put on the mandrel, substantially as and for the purpose of preventing the pipes, when formed, from adhering to the mandrel.

And, third, The combination of the rotating mandrel, the cylinder on which the mandrel rotate, the kettle or other vessel for containing the liquid mastic or cement, and the guide or equivalent means for guiding the sheet of paper or other tissue, substantially as described.

EXTENSION.

Camphene Lamp.—E. B. Horn, Boston, Mass. Patented Feb. 6, 1849:

I claim the manner in which I construct the fountain, in order to allow the rays of light proceeding from the wick of the burner to pass downwards through both the internal and external concentric sides or shells of the fountain, that is to say, I claim an internal translucent side or shell, in combination with an external concentric side or shell, whether the said two concentric translucent sides of the said fountain be connected together by a translucent or opaque bottom.

IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in

our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from $30 down to $15. Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Notes and Queries

A. M. B., of Mich.—Many inquiries of a business nature are made of us, from time to time, which we do not consider ourselves called upon to undertake to answer, unless the correspondent remits an amount sufficient to pay us for our trouble to look up the information. You do not even inclose a postage stamp to pay for a reply to your inquiries; and it is unreasonable to expect us to advertise, through our column of "Notes and Queries," a dealer in oatmeal and barley mills, unless we are paid for it. Few newspaper publishers in the United States are more willing to accommodate their readers than ourselves, but there is such a thing as putting an unreasonable pressure upon us in this respect. We hope you find the SCIENTIFIC AMERICAN worth what it costs you.

M. S. O., of Mass.—You inquire how much power there is in a rectangular magnet three feet in diameter and four inches in thickness; and you also wish to know what weight it will draw on a carriage. A magnet of such a great size has never yet been made. The power of a magnet does not depend upon its mass, but resides on the surface, and no person can tell you the amount of attractive power in a magnet from its size. Two permanent magnets of the same size oftentimes differ greatly in power. A small magnet exhibits more attractive force, proportionately, than a large one. The strongest magnet described is one which was worn by Sir Isaac Newton in a finger-ring; it lifted 150 times its own weight. A horse-shoe electro-magnet, one inch long (which is entirely different from a permanent magnet) has lifted 420 times its own weight.

E. K. B., of Va.—There are no recorded experiments published respecting the pressure exercised by the explosion of gases. Hydrogen gas charged with carbon and the gas derived from naphtha are the same in nature and substance. When hydrogen gas is mixed with three volumes of atmospheric air it explodes almost instantaneously when ignited; but one volume of pure oxygen mixed with two of hydrogen produces a more violent explosion. By assuming the expansion of combustibles to be 1,728 times that of their original bulk, the full pressure of exploded naphtha would be equal to 25,000 pounds on the square inch.

S. H., of Vt.—We have not received the paper containing a notice of the iron-ore bed to which you refer. The value of ore can only be ascertained by experiment conducted by a competent person. Good steel can be made from all our American magnetic iron ores.

F. J. C., of Philadelphia.—You will find a spray steam boiler, such as you suggest, described on page 185, Vol. VII (new series) of the SCIENTIFIC AMERICAN. Water exposed to an extensive heating surface evaporates into the atmosphere (if the latter is dry) at all temperatures, but the pressure is in proportion to its temperature. A low temperature of steam indicates low pressure.

S., of Pa.—We cannot guarantee to furnish back numbers at any time during the year. It frequently happens that we run out of certain numbers long before the close of the year. You had better make sure of the complete volume by subscribing now.

C. R. D., of Ill.—We do not see why your draught should be bad; the chimney is high enough certainly. You had better see if there is no defect in the setting of your boiler or some other local cause which affects the draught before you alter the chimney. We cannot say positively whether the arrangement alluded to would be of any value until we know more about it. Our impression is that it would be beneficial.

S. W., of Pa.—Your communication is upon an interesting subject, but there are some parts of it so obscurely treated that we cannot understand your meaning, hence it cannot be published.

L. E. A., of S. C.—We are obliged for your good opinion and the information you send us, but it comes too late to be of service. Be so kind as to forward any other details in reference to the engine in question that you possess.

R. E. R., of Pa.—You will find a hot-air engine illustrated on page 97, present volume of the SCIENTIFIC AMERICAN, which we think very highly of. Wilcox's air engine is illustrated on page 161, Vol IV (new series), of the SCIENTIFIC AMERICAN.

L. C. R., of N. J.—The idea you suggest, in reference to the cancelation of postage stamps, is to simply use the old stamp as now, except that you slide one end of it over the edge of the letter, so that it may be torn off at the Post-office. The plan will not work. Not one person in a hundred would ever put stamps on in that way unless especially told to do it.

E. K. H., of N. Y.—The amount of pressure upon the surface of an exhausted receiver is 15 pounds on the square inch. This is called one atmosphere. A perfect vacuum cannot be obtained either in a condenser or air pump, hence the interior pressure is usually subtracted from the exterior pressure in speaking of the vacuum in the condenser of an engine.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, February 11, to Wednesday February 18, 1863:—

T. C. McK., of Tenn., $46; B. R. A., of N.Y., $40; S. B. C., of N.Y., $10; J. W. C. H., of Denmark, $20; W. P. W., of N.Y., $20; C. O. F., of Maine, $20; J. H., of Ohio, $14; D. J. O., of Pa., $15; P. D., of N. Y., $50; L. B., of Wis., $25; J. W. B., of Ind., $25; W. D. G., of Va., $16; H. B., of Iowa, $15; J. A., of Ky., $12; G. & V., of N. Y., $16; Z. W., of Cal., $130; W. H. H., of Cal., $25; W. A. D., of Ohio $20; I. L., of N. Y., $30; J. L. A., of N. Y., $45; I. S. S., of N. Y., $22; A. F. N., of N. Y., $10; J. M. A., of Mass., $10; L. & D., of Ill., $15; G. G. H., of Ill., $15; B. L. W., of Mass., $29; W. P., of Md., $25; J. C. H., of Mass., $45; D. & T. W., of Cal., $25; J. McL., of Ohio, $12; T. D. R., of N. Y., $10; T. C., of R. I., $30; B. F. S., of Iowa, $16; A. B., of N. J., $15; J. W., of Iowa, $45; J. N., of N. Y., $20; W. S. T., of Iowa, $20; G. T. L., of Pa., $56; J. H. F., of Mass., $10; W. T. R., of N. S., $25; M. D. H., of N. Y., $16; T. K., of Ill., $15; J. P. J., of N. Y., $16; G. H., of R. I., $15; M. V. D., of N. J., $10; J. K., of Conn., $56; A. A. G., of N. Y., $16; A. W., of Ill., $15; W D. S., of N.Y., $25; S.T., of Mass., $16; H. B., of England, $19; W. F. of Mass., $32; P. J. C., of Conn., $16; L. A., of Wis., $15; J. H., of N. Y., $32; G. G., of Ill., $10; S. C. K., of Mass., $15; F. W. G., of N. Y., $56; L. W., of N. Y., $26; T. B. V., of N. Y., $26; B. F. H., of N. Y., $16; J. Van D., of N. Y., $15; T. R. C., of Mo., $15; R. S. C., of Iowa, $16; D. C. S., of Conn., $25; J. C. H., of Mass., $30; E. J. W., of N. Y., $26; J. T., of N. Y., $26; J. B. W., of R. I., $16; D. D. C., of Mass., $16; H. B. M. & Son, of Mich., $15; J. H. F., of Mass, $15; J. W., Jr., of Ky., $20; J. D., of Ill., $26.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, February 11, to Wednesday, February 18 1863:—

B. R. A., of N. Y., (2 cases); J. C. H., of Mass.; W. D. S., of N.Y.; E. J. W., of N. Y.; T. K., of Ill.; J. D., of Ill.; T. B. V., of N. Y.; I. S. S, of N. Y.; D. C. S., of Conn.; L. B., of Wis; B. L. W., of Mass.; L. R., of N. Y.; F. W. G., of N. Y.; L. W., of N. Y.; G. G., of Ill.; T. D. R., of N. Y.; J. K., of Conn., (2 cases); W. P., of Md.; W. T. R., of N. S.; J. T., of N. Y.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

A VALUABLE WORK FOR INVENTORS, PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the Granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but also to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No. 37 Park Row, New York. 9

A MESSIEURS LES INVENTEURS—AVIS IMPORTant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natalie. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
SCIENTIFIC AMERICAN Office, No. 37 Park-row, New York.

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For Railroads, Steamers, and for Machinery and Burning. PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The SCIENTIFIC AMERICAN, after several tests, pronounces it "superior to any other they have ever used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 9 13

FOR HUB-MORTISING MACHINES, SPOKE PLANers, Blanchard Lathes and Wheel Machinery. Address J. A. FAY & CO., or E. C. TAINTER, succeeding partner, Worcester, Mass. 9 1*

SNOW'S PATENT CASH BOXES FOR THE NEW Currency. Patented Oct. 21, 1862. Price 50 cents. Sentpostpaid for $1. Territorial rights for sale. Sold wholesale and retail by GEORGE K. SNOW & HAPGOOD, 22 Court street, Boston. 9 3

T. SHANKS, MACHINIST, SEWING MACHINE DEALer and Repairer. All kinds on hand for sale or exchange. No. 36 N. Green street, Baltimore, Md. 9 4*

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, also three and four spindle Drills of superior quality, on hand and finishing, for sale low. For description and prices address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn.

WANTED—A GOOD SECOND-HAND STEAM ENgine, 25 to 30 horse power. Address GUILD & GARRISON, 74 Beekman street, New York, or 55 and 57 First street, Williamsburgh, L. I. 9 tf

THE EASY WASHER.—FOR SALE, THE PATENT Right of the Easy Washer for the counties of Essex, Middlesex Norfolk and Suffolk, Massachusetts. The Easy Washer is a machine which has been thoroughly tested, and defies competition. It is a thing every family needs. It is so cheap every family can buy it, and no family will do without it after having learned its advantages. Price of machines $5. Address LUCIUS JACKSON, NEW MILFORD, Conn. 1*

HOWARD ASSOCIATION, PHILADELPHIA, FOR the Relief of the Sick and Distressed, afflicted with Virulent and Chronic Diseases. Medical advice given gratis by the Acting Surgeon. Valuable Reports on various Diseases, and on the NEW REMEDIES employed in the Dispensary, sent in sealed letter envelopes, free of charge. Address DR. J. SKILLIN HOUGHTON, Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 1*

WANTED—TO EXCHANGE SOME PATENT TERRItory of one of the best Steam Governor Valves in use for an engine and boiler from 8 to 12 horse-power. Also to furnish any responsible party with valves, to be paid for if they give satisfaction. For particulars address A. WHITE & CO., Geneseo, Illinois. 9 4*

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for ngraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline publish.

For further particulars, address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
New York City

DR. G. W. SCOLLAY'S
AIR-TIGHT DEODORIZING BURIAL-CASE,
PATENTED MARCH 18, 1862.

The undersigned desires to call the attention of Undertakers, and all parties interested, to a new and useful improvement in Burial-Cases, by means of which a human body may be withheld from interment some sixty to ninety days, or more, without the emission of the usual offensive odor, and at a small expense beyond that of the ordinary burial-case. The invention is simple, effective, and not liable to derangement.

When the invention was completed, and its efficacy tested by numerous experiments, to the satisfaction of the undersigned, he brought it before the Western Sanitary Commission of St. Louis, who, on the 28th of April, 1862, appointed a Scientific Committee to investigate its merits, and report thereon. This Committee, under date of May 15, 1862, presented an elaborate report, for which there is no room in this advertisement to mention. The conclusion of the report, however, is here given:

"In conclusion, your Committee cannot but feel that the advantages of the improvement are obviously many and great, and the practicable points deductible from the foregoing, and which your Committee regard as established, are as follows:

"FIRST—Dr. Scollay has succeeded in making the common wooden coffin water-tight and air-tight, up to a certain degree of pressure.

"SECOND—Beyond this point, by the judicious application of a self-adjusting valve, the gases are allowed to escape, and the coffin secured against explosion.

"THIRD—By the introduction of a chemical compound, he renders the escaping gases inoffensive and disinfecting.

"FOURTH—Its cheapness is such as to place it within the reach of all.

"FIFTH—Having examined the improvement carefully, and conducted satisfactory experiments, we regard it as our duty in the present exigency to bring it speedily before the public, and recommend its general adoption.

"All of which is respectfully submitted:
(Signed) "S. POLLAK, M.D.
"CHAS. A. POPE, M.D.
"JOHN T. HODGEN, M.D.
"M. SCHUYLER, D.D.
"JOHN B. JOHNSON, M.D.
"R. B. HAZARD, JR.

"St. Louis, May 15, 1862."

When the foregoing had transpired, the subscriber went immediately to Washington with the following letter of introduction, to lay the matter before the proper authorities there:

"ROOMS WESTERN SANITARY COMMISSION,
ST. LOUIS, June 26, 1862.

"DR. WM. G. HAMMOND, Surgeon-General U. S. A.:

"DEAR SIR—I take pleasure in introducing to you Dr. G. W. Scollay, of this city, who, on our recommendation, visits Washington to bring to your notice an improvement in Burial-cases, which is regarded by this Commission as of great value. I would simply state that a Scientific Committee was appointed by this Commission to investigate the merits of this invention, the result of which investigation is an elaborate report, in which the Commission fully concur, and to which I respectfully refer you.

"Yours, very truly,
"JAMES E. YEATMAN, President."

The result of the visit of the undersigned to Washington is best set forth by the following certificates of the Surgeon-General and the Assistant-Surgeon-General of the U. S. A.:

"OFFICE SURGEON-GENERAL U. S. A.
"WASHINGTON, July 18, 1862.

"My attention has been called by the Western Sanitary Commission at St. Louis, to an invention of Dr. G. W. Scollay, called an 'Air-tight Deodorizing Burial-case.' I have examined the same; and at my request, Dr. Scollay has conducted and concluded an experiment therewith, under my personal observation.

"The result is perfectly satisfactory, and has convinced me that the claims made for this case are substantial, and that the improvement is one of great practical utility; that the principle of its most important feature—the deodorizer—is correct; while the application of it, as made by Dr. Scollay, to an ordinary burial-case, is so simple, cheap and effective, as to commend it strongly for general use. For sanitary and other reasons, I cordially recommend its adoption for army purposes, especially in all cases where it is desirable to withhold a body from interment an unusual length of time, or to transport it to distant points.

"WILLIAM A. HAMMOND,
"Surgeon-General U. S. A."

"I fully concur in the above opinions and recommendation of the Surgeon-General, and think the invention of Dr. Scollay very valuable in its sanitary relation.

"R. C. WOOD, Assistant Surgeon-General,
"Surgeon-General's Office, Washington, July 18, 1862."

The undersigned takes great pleasure in also submitting for public perusal the following communication from "the great Surgeon of the Age," the celebrated Doctor Valentine Mott, who has kindly permitted its publication:—

"NEW YORK,
"December 27th, 1862."

"At the request of Mr. Boyle, and accompanied by him and Mr. Todd I visited to-day and carefully examined the 'Air-tight Deodorizing Burial-case' of Dr. Scollay, of St. Louis, Mo.

"In times like the present, when so many are bereft of one or more members of their families by the calamities of a horrid war, it is humane and natural that their remains should be sought and transported to their homes, in order that their bones may repose with their kindred.

The rich and the titled can afford to be embalmed, but the commoner must be pitched into the pit unheeded and unknown.

"*Dr. S. is entitled to great credit for his newly-invented Coffin, as having done a public good.*

"The lightness and cheapness of the case are what will recommend it to the public.

"*The composition that is put in the Deodorizing Box at the foot of the Coffin within seems quite sufficient to prevent the least disagreeable odor.*

"In the experiment which I witnessed, the Body had remained in the Coffin for *nearly eight weeks in a chamber without emitting the least offensive smell.*

"The small patent elastic, self-acting and self-adjusting valve placed at the foot of the coffin, in direct connection with the Chemical Box or Deodorizer, and serving the two-fold purpose of permitting the escape of the offensive gases generated by the decomposition of the Body enclosed therein, *and, at the same time, excluding the entrance of atmospheric air*, evinces, on the part of Dr. Scollay—from the simplicity of its mechanical construction—*rare inventive skill*, and he assuredly merits deserved praise for his ingenuity.

"VALENTINE MOTT,
"No. 1 Gramercy Park."

"NEW YORK,
"February 24, 1863.

"A period of nearly five weeks having elapsed since I wrote the above, I have this day again made another *careful examination* of the experiment alluded to. The decomposition of the subject (which I omitted to say is enclosed in an ordinary 'Walnut' or 'Whitewood' coffin, with Dr. Scollay's invention attached) has rapidly increased, and, although it has remained upwards of *three months* in a *room or chamber, at a mild temperature*, I cannot discover the *slightest approximation to any disagreeable or offensive odor.*

"I, therefore, have no cause to alter the opinions which I have heretofore expressed in relation to Dr. Scollay's ingenious invention.

"VALENTINE MOTT,
"No. 1 Gramercy Park."

The undersigned would state, as a sequel to this mode of bringing his invention before the public, that his "Air-Tight Deodorizing Burial-Case" has been adopted, and is now in general use in some of our large Western cities; and that it can be immediately furnished by any of our undertakers to parties desirous of having the remains of their deceased relatives or friends removed from this or other cities, or from distant localities. As before stated, this case is not expensive. It is extremely light and therefore convenient for transportation—is not liable (*like the Iron Burial-case in present use*) to explosion from the expanding pressure of gases generated by ordinary decomposition; and, *which is more important than all*, the very *expensive, disagreeable* and oftentimes *unsuccessful process of the present method of Embalming is entirely avoided*—the simple application of this invention to the *ordinary Wooden Coffin rendering a recourse to the latter mode of interment altogether unnecessary.*

G. W. SCOLLAY, M.D.

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Mr. John A. Smithers, undertaker, St. Louis, Mo.;
Mr. C. S. Wheeler, undertaker, Baltimore, Md.;
Mr. J. M. Hall, undertaker, Philadelphia, Pa.;
Mr. Wm. H. Bigelow, No. 461 Pennsylvania Avenue, Washington City.

Parties desiring information, or wishing to purchase the right of using this invention in either of the States or Territories, will please address
O. W. CHILD,
No. 78 Cedar street, New York.
New York, Feb. 20th, 1863. 9 2*

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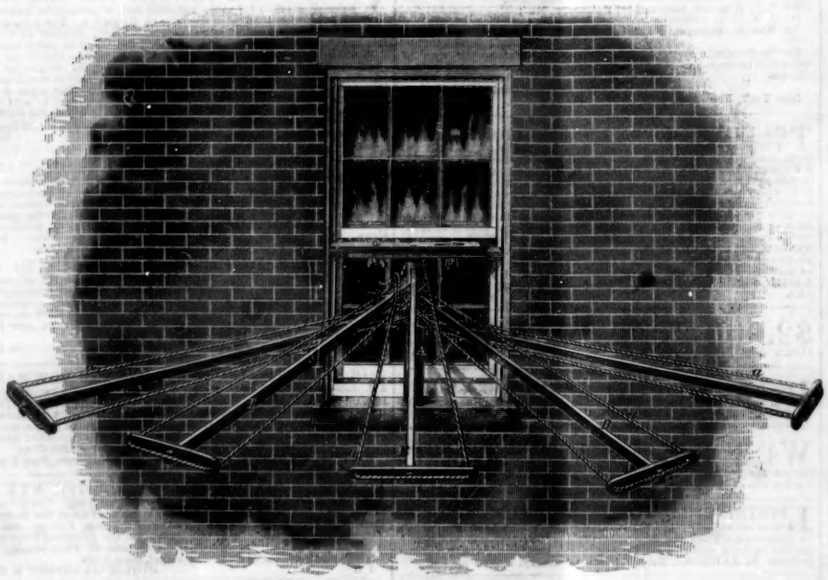
Powers's Patent Clothes-dryer.

In large cities, where the housewife has no facilities for bleaching her linen, or indeed but little room for even drying it, advantage must be taken of every inch that can be had for the purpose. The windows of houses, the roofs of them, and even balconies and piazzas may be seen filled with the family garments on the recurrence of washing-day. In some places we have noticed poles planted in the ground to which pulleys were attached having lines run through them leading to the upper windows of the tenements; this plan is very inconvenient and unsightly. The invention we illustrate herewith will be readily understood by referring to the letters affixed to the several parts.



POWERS'S PATENT CLOTHES-DRYER.

The upright post, A, has several mortices in it, through which the bars, B, are thrust; this post turns readily upon its center, so that the arms can be moved in any direction laterally. The clothes lines are rove through the transverse heads at the end of the bars, carried around behind the swivel post and there secured. The slotted bar, C, is provided with thumb-screws so that it can be secured when it is adjusted to the size of the window frame; there is also a key, or horizontal piece of wood, provided, which goes through the swivel post, A, and prevents it from turning spontaneously during the process of hanging out the clothes. The operation of this machine is as follows:—When it is desired to hang out the wet clothes, the bars are drawn through the slots into the room; the clothes are hung upon the lines, fastened there and the bars are pushed out with the garments attached; thus the danger and inconvenience of reaching out of the window is obviated. When not in use this apparatus can be readily taken apart and stowed away so as to occupy but little room.

This invention was patented on January 6, 1863, by Wesley Powers, of Preston, N. Y., and furthur information can be had by addressing him at that place.

TEA.

Mixtures of tea and substitutes for it are very generally repudiate; but probably there are just as many mixtures of this vegetable product sold as there are of coffee. Whenever an article becomes high in price it tempts men to adulterate it, and this undoubtedly is the case at present with tea as well as coffee, though perhaps, not to the same extent. Tea, like coffee, containsa peculiar vegetable principle, called *thein*. It is composed of carbon, 8 parts; nitrogen, 2 parts; hydrogen, 5 parts; oxygen, 3 parts. It is said to possess the same properties as caffeine in preventing the waste of animal tissue. There is a very small quantity of thein in the leaves of tea—not much above one half per cent. An infusion of tea differs from that of coffee in containing manganese and iron. Liebig states that an infusion of tea "contains the active constituents of the most powerful mineral springs." In the use of tea and coffee the same eminent chemist states that a cup of strong coffee after dinner instantly checks digestion, but tea has not the same power. According to the observations of Liebig, therefore, the very common practice with many persons of taking strong coffee after dinner is unfavorable to digestion. With respect to the use of tea and coffee he says: "We think it highly probable, not to say certain, that the instinct of man, feeling certain blanks—certain wants of the intensified life of our times, which cannot be satisfied or filled up with mere quantity, has discovered in these products of vegetable life, the true means of giving to his food the desired and necessary quality. Every substance, in so far as it has a share in the vital processes, acts in a certain way on our nervous system, on the sensual appetites and the will of man."

BRIGG'S PATENT HAND-IRON ENVELOPE.

Our engraving is a representation of an attachment to the hand or smoothing iron, whereby its efficiency as a household implement is much enhanced. Our inventors are rapidly invading the precincts of

the kitchen, and with patent washing machines, clothes-driers, wringers and a host of others, so reducing the labor of "Bridget" that her position will soon be a sinecure. The invention in question consists in applying a metallic envelope or guard, A, to the iron, whereby a film of air is interposed between the iron and covering, thus preventing heat from radiating. It would appear from the use of this appendage that the iron can be heated sooner, remain hot longer and be less inconvenient to the ironer than without the envelope. This envelope can be readily adapted to all irons, either new or old. This invention was patented Feb. 5, 1861, by Mr. John C. Briggs, of Concord, N. H. The entire patent is for sale; further particulars can be obtained by addressing the inventor as above.

RECOVERED TREASURE.—A telegram from San Francisco says that the steamer *Constitution* had arrived from Panama with $300,000 recovered from the wreck of the *Golden Gate*. The British steamer *Robert Low* has arrived from Victoria and taken her place in the new line of steamers between San Francisco and China. She sails for China on March 1st. Advices from the wrecking expedition express the belief that nearly all the treasure lost in the *Golden Gate* will be recovered.

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